

KIRK WYE BROWN, Ph.D.

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF NEW YORK

VILLAGE OF STILLWATER, TOWN OF STILLWATER,
TOWN OF WATERFORD, WATER COMMISSIONERS OF
THE TOWN OF WATERFORD, VILLAGE OF WATERFORD,
TOWN OF HALFMOON and COUNTY OF SARATOGA,

Plaintiffs,

-against- 1:09-CV-0228, DNH-DRH

GENERAL ELECTRIC COMPANY, UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY and LISA P.
JACKSON, Administrator of the United States
Environmental Protection Agency,

Defendants.

SARATOGA COUNTY WATER AUTHORITY,

Plaintiff,

-against- 1:11-CV-0006 DNH-DRH

GENERAL ELECTRIC COMPANY,

Defendant.

STENOGRAPHIC MINUTES OF VIDEOTAPED SWORN
TESTIMONY conducted of KIRK WYE BROWN, Ph.D., on the 16th
day of April 2014, at the offices of Dreyer Boyajian, 75
Columbia Street, Albany, New York, commencing at 9:06
a.m., before DIANE DALY-GAGE, a Shorthand Reporter and
Notary Public within and for the State of New York.

TSG Job #72747

1 KIRK WYE BROWN, Ph.D.

2 APPEARANCES:

3 On behalf of Plaintiffs Village of Stillwater,
4 Town of Stillwater, Town of Waterford, Water
5 Commissioners of the Town of Waterford, Village of
6 Waterford, County of Saratoga and Saratoga County
7 Water Authority:

8 DREYER BOYAJIAN
9 75 Columbia Street
10 Albany, New York 12210
11 BY: DONALD BOYAJIAN, ESQ.

12 On behalf of Plaintiff Town of Halfmoon,

13 NOLAN & HELLER
14 39 North Pearl Street
15 Albany, New York 12207
16 BY: PATRICK TEDESCO, ESQ.

17 On behalf of Defendant General Electric Company:

18 WILLIAMS & CONNOLLY
19 725 Twelfth Street, NW
20 Washington, DC 20005
21 BY: NEELUM WADHWANI, ESQ.
22 -and-
23 JONATHAN WILLIAMS, ESQ.

24
25 VIDEOGRAPHER: DREA LEANZA

1 KIRK WYE BROWN, Ph.D.

2 S-T-I-P-U-L-A-T-I-O-N-S

3
4 It is hereby stipulated and agreed by and
5 between the attorneys for the respective parties hereto
6 that the sealing and filing of the Notary's oath be
7 waived; that the examination be conducted before Diane
8 Daly-Gage, a Shorthand Reporter and Notary Public in and
9 for the State of New York; that the filing of the
10 transcript of testimony in the Office of the Clerk of the
11 Court be waived; that all objections to questions, except
12 as to the form thereof, are specifically reserved to the
13 time of trial; and that the transcript of testimony may
14 be signed before any Notary Public or other officer
15 authorized to administer oaths.
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1 KIRK WYE BROWN, Ph.D.

2 VIDEOGRAPHER: This is the start of tape
3 labeled number one of the videotaped deposition
4 of Kirk Wye Brown, Ph.D., in the matter of
5 Village of Stillwater, et al, plaintiffs
6 against General Electric Company, defendant,
7 United States District Court, Northern District
8 of New York, case number 1:09-CV-00228 DNH-DRH.
9 This deposition is being held at Dreyer
10 Boyajian, 75 Columbia Street, Albany, New York
11 on April 16th, 2014 at approximately 9:06 a.m.

12 My name is Drea Leanza. I am the legal
13 video specialist from TSG Reporting, Inc.
14 headquartered at 747 3rd Avenue, New York, New
15 York. The court reporter is Diane Daly in
16 association with TSG Reporting.

17 Will counsel please introduce yourself.

18 MR. BOYAJIAN: I'm Donald Boyajian from
19 Dreyer Boyajian on behalf of Saratoga County
20 and the Saratoga County Water Authority.

21 MR. TEDESCO: Patrick Tedesco from Nolan
22 and Heller on behalf of the Town of Halfmoon.

23 MS. WADHWANI: Neelum Wadhwani from
24 Williams & Connolly on behalf of General
25 Electric Company.

1 KIRK WYE BROWN, Ph.D.

2 MR. WILLIAMS: And Jonathan Williams from
3 Williams & Connolly on behalf of General
4 Electric Company.

5 VIDEOGRAPHER: Will the court reporter
6 please swear in the witness.

7 Thereupon,

8 KIRK WYE BROWN,
9 (having been first duly sworn by the Notary
10 Public, was examined and testified as follows:)

11 VIDEOGRAPHER: Please proceed.

12 BY MS. WADHWANI:

13 Q Good morning, Dr. Brown.

14 A Good morning.

15 Q As a prefatory statement I will tell you that I have
16 a little bit of a cold today. So if you're having a
17 hard time hearing me, especially through my scratchy
18 voice, I apologize. Please just ask me to speak up
19 and I will do so.

20 You've been deposed before?

21 A I have.

22 Q How many times?

23 A Oh, it's near 100.

24 Q When was the last time you were deposed?

25 A It's on my resume. It was late last year.

1 KIRK WYE BROWN, Ph.D.

2 Q Okay. Since you've been deposed well over a hundred
3 times if it's okay with you I'll skip over the
4 preamble about how this will work. I'm sure you
5 know that very well.

6 When were you first engaged to work on the
7 matter in this case?

8 A I was first engaged back in 2009.

9 Q 2009 did you say?

10 A Yes.

11 Q And at that time in 2009 what was the nature of your
12 engagement?

13 A I was asked to look at the dredging, potential
14 dredging, I was engaged before the dredging, the
15 potential impact of the dredging on the PCB
16 concentrations in the river.

17 Q Who were you engaged by?

18 A Boyajian.

19 Q Dreyer Boyajian?

20 A Yes.

21 Q Was it Mr. Don Boyajian sitting here today?

22 A Yes.

23 Q And were you retained on behalf of any particular
24 municipality or entity?

25 A There were a group of them but I don't know whether

1 KIRK WYE BROWN, Ph.D.

2 that's changed over time. Stillwater, Waterford are
3 the two that stick out in my mind.

4 Q Okay. I see that you've brought some materials with
5 you today.

6 A Right.

7 Q What did you bring?

8 A I brought a copy of my report, rebuttal report,
9 other people's reports, rebuttal reports in this
10 case. I also brought the references that I used in
11 my report. So I have the references, in some cases
12 not the whole thing, but the excerpts from them. I
13 brought papers -- one of the problems that we've had
14 was we were looking at papers concerning what was
15 known when about the movement of groundwater, the
16 modeling of groundwater and things of that nature
17 and that work was done particularly at the Hanford
18 site, among others, but there was a lot done at the
19 Hanford site. And some of those papers made it into
20 my report, but because of the age of the papers,
21 it's been difficult to get them. Since then I've
22 gotten a few more. So I brought that to disclose
23 that for you.

24 Q And let me ask you a question there about those
25 papers related to the Hanford site. Did you have

1 KIRK WYE BROWN, Ph.D.

2 those papers with you when you formed your opinions
3 in this case?

4 A Those that are cited in my report I had at the time.
5 But since you have to get these off of interlibrary
6 loan and microfiche, some came in later and I just
7 wanted to be sure that you had the complete package.

8 Q I appreciate that. My question to you is, the ones
9 that came in later had you read those later articles
10 prior to submitting your expert report in this case?

11 A No, I didn't have them at that time.

12 Q And did you have those articles prior to submitting
13 your rebuttal report in this case?

14 A One or two of them came in in between, but I would
15 have difficulty sorting out that.

16 Q If you look through those could you tell me which
17 ones came in between your expert report and your
18 rebuttal report?

19 A No, I couldn't tell you.

20 Q Did you read and rely upon the one or two articles
21 related to the Hanford site that came in subsequent
22 to your original report but before your rebuttal
23 report in drafting your rebuttal report?

24 A No, I did not. And then to complete the response to
25 your question, I brought in a few documents that

1 KIRK WYE BROWN, Ph.D.

2 deal with statistical analysis that I did of some of
3 the data and some excerpts of transect studies, some
4 information on sediment traps, machines and also a
5 series of memos and internal memos and other
6 correspondence concerning the notice of violations
7 and the response to those by the GE employees.

8 Q Okay. What we'll probably do is at a break I'll
9 take a look at these and we'll probably mark some.
10 But for now I'd like you just to set those aside and
11 at any point during my questioning if you want to
12 look at those, you should feel free to do so.

13 I'm going to go ahead and mark exhibits
14 one, two and three right now. Exhibit 1 is the
15 expert report of Kirk Wye Brown dated
16 September 13th, 2013.

17 (Brown Exhibit 1 was marked for
18 identification.)

19 MS. WADHWANI: I'm going to mark as
20 Exhibit 2 the expert rebuttal report of Dr.
21 Brown, dated February 14th, 2014.

22 (Brown Exhibit 2 was marked for
23 identification.)

24 MS. WADHWANI: And we're going to mark as
25 Exhibit 3 what was handed to me this morning by

1 KIRK WYE BROWN, Ph.D.

2 Mr. Peluso and represented to be an update of
3 your resume, Dr. Brown; is that correct?

4 A That's correct.

5 (Brown Exhibit 3 marked for identification.)

6 BY MS. WADHWANI:

7 Q Dr. Brown, can you please confirm that the two
8 exhibits we marked as Brown Exhibit 1 and Brown
9 Exhibit 2 are the expert witness report and the
10 expert rebuttal report that you have submitted in
11 this case?

12 A Yes, they are.

13 Q Focusing on Brown Exhibit 1, your expert report in
14 this case, could you please turn to page 13?

15 A Yes.

16 Q Section 1.3 states that your hourly rate of
17 compensation in this case is \$300 per hour for
18 non-testimony time, and \$350 per hour for testimony
19 time. Are those statements factually correct?

20 A Yes.

21 Q I saw in your report that you're an independent
22 consultant; is that right?

23 A That's correct.

24 Q Does that mean that you don't work for any company
25 presently?

1 KIRK WYE BROWN, Ph.D.

2 A That's right.

3 Q You work for yourself?

4 A Right.

5 Q How many non-testifying hours have you spent working
6 on this engagement?

7 A A little bit over 100. Now, let me also, sort of
8 full disclosure, I have a man who works with me on
9 this.

10 Q What's the name of that gentleman?

11 A Mike Goladay, G-O-L-A-D-A-Y.

12 Q Do you know how many hours Mr. Goladay has worked?

13 A I do not, but we could look at the billing through
14 what was billed.

15 Q Okay. Do you have a best approximation of how many
16 hours Mr. Goladay has worked?

17 A More than I have.

18 Q Besides Mr. Goladay did you hire, retain any other
19 person to assist you with work on this matter?

20 A Did retain -- actually Mike did, a graduate student
21 to run the statistical analysis that I relied on.

22 Q And what's the name of this graduate student?

23 A Oh, boy, I don't recall.

24 Q And what's the statistical analysis that this person
25 performed?

1 KIRK WYE BROWN, Ph.D.

2 A Ran a regression analysis on the concentrations
3 measured at several locations in the Hudson River,
4 concentrations of PCBs.

5 Q Do you know when this statistical analysis was
6 performed?

7 A Not specifically. It was before the -- before the
8 report.

9 Q Do you know where that data concerning the PCB
10 concentrations in the river was derived from?

11 A Yes. From the EPA databank.

12 Q Do you know what years were used?

13 A Yes. 2004 through 2013.

14 Q When did Mr. Goladay start working on this matter?

15 A 2009.

16 Q And what has been the nature, generally speaking, of
17 the work he has assisted you with?

18 A Well, initially we were in the process of preparing
19 I believe it was an affidavit before there was a
20 settlement reached concerning the possibility of
21 replacing the water supplies during dredging. That
22 was the initial activity.

23 Q A settlement with whom?

24 A I'm not clear on who the settlement was, but my
25 understanding was that there was an agreement that

1 KIRK WYE BROWN, Ph.D.

2 EPA would provide all the water or pay for if
3 necessary during that period.

4 Q And for whom -- scratch that.

5 With whom was this settlement reached?

6 MR. BOYAJIAN: Objection. Asked and
7 answered.

8 A Yeah. I don't know the details of that.

9 Q You don't know which municipality or entity received
10 the water supplies during that settlement?

11 A I don't know what the details of that are. No.

12 Q Okay. Did you know at the time?

13 A No.

14 Q What else has Mr. Goladay done to assist you in your
15 engagement in this matter?

16 A Moving forward then once we were given the current
17 assignment which was to write a report. He gathered
18 the literature and does all the electronic
19 communication on it. He also drafted parts of the
20 report.

21 Q Okay. Sitting here today do you recall which parts
22 of the report that Mr. Goladay drafted or which
23 sections, subject matters?

24 A Yeah. We worked together on it and discussed it
25 back and forth. And he generally after our

1 KIRK WYE BROWN, Ph.D.

2 discussions writes it up, gets the references
3 together to support it and then I review it, revise
4 it as I want. I also tell him what points I want to
5 make and what references we ought to use for them,
6 that type of thing. We've been doing this for 15
7 years together. He was my graduate student at one
8 time, so we make a rather effective team at putting
9 these things together.

10 Q Did you supervise Mr. Goladay's dissertation?

11 A I did.

12 Q What was the topic of his dissertation?

13 A Oh, boy, I don't recall. It's been too far back and
14 I've supervised so many that I don't recall.

15 Q Was Mr. Goladay in the department of agronomy at
16 Texas A&M when he received his dissertation?

17 A He was at that time, yes.

18 Q And he received his dissertation from Texas A&M?

19 A It's a master's degree.

20 Q A master's degree, I apologize. Thank you.

21 A Yes.

22 Q Do you know if Mr. Goladay went on and received a
23 Ph.D.?

24 A He did not.

25 Q Besides Mr. Goladay and yourself did anyone else

1 KIRK WYE BROWN, Ph.D.

2 draft segments of your expert rebuttal report or
3 your expert report?

4 A No.

5 Q Did you review and approve the final versions of
6 your report before they were submitted to GE on your
7 behalf?

8 A Oh, yes.

9 Q Can you please turn to page eight of your original
10 report that we've marked as Exhibit 1. In Section
11 1.0 at the top of page eight of your initial report
12 it's entitled Introduction. Do you see that?

13 A Yes.

14 Q And in this section you identified the topics you
15 were asked to opine about in this matter for
16 purposes of this report in letters A through D.
17 Does Section 1.0 accurately set forth the topics you
18 were asked to provide opinions on in this case?

19 A Yes. For the report.

20 Q What do you mean by that?

21 A Well, once it came to the rebuttal report, than that
22 expanded somewhat because we were then responding to
23 other experts' reports.

24 Q For purposes of your expert report that you
25 submitted on September 13, 2013 the topics listed in

1 KIRK WYE BROWN, Ph.D.

2 A through D are the topics for which you were asked
3 to provide opinions on; correct?

4 A Correct.

5 Q And so is it fair to say that in short you were
6 asked to provide opinions concerning the impact of
7 PCBs on the Hudson River, the impacts of PCBs on the
8 public water systems that rely upon the Hudson for
9 potable water and the impacts of PCBs upon the
10 exposure of residents and communities along the
11 Hudson?

12 A Yes.

13 Q And what do you mean here in this Section 1.0 by
14 impacts?

15 A Essentially how it altered the, and it changes
16 somewhat from one to another, but how the PCBs
17 altered the concentration of PCBs in the river and
18 how they were partitioned between, for instance oil
19 settlement in the river and the water, which isn't
20 specifically mentioned there. Well, the water is
21 the second one. And then how that would've impacted
22 the drinking water.

23 Q Okay. And when you say how the PCBs altered the
24 concentrations in the water, the concentrations of
25 what?

1 KIRK WYE BROWN, Ph.D.

2 A Of PCBs.

3 Q So I'm a little confused now.

4 A Well, what we were looking at is the PCBs were
5 released into the river, they're partitioned into
6 various components, the sediments, the oils, and
7 then that impacts what the concentrations are going
8 to be in the water.

9 Q Okay. You said just a moment ago that what you mean
10 by impacts changes a little bit for each of these
11 topics that you've listed here in Section 1.0. So
12 looking first at Section A, what do you mean by the
13 impacts of PCBs released by the General Electric
14 Company facilities on the oil, sediments, channel
15 and river banks of the Hudson River?

16 A What I mean is how the released PCBs changed the
17 concentration in these segments, the oil and
18 sediment and then the water. So once they were
19 released into the river, how did they partition to
20 these different components.

21 Q Just so I'm clear then. For Section A you looked at
22 how once the PCBs made their way into the river they
23 partitioned into various aspects of the river, soils
24 versus sediments versus the flowing water?

25 A Right.

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2 Q Thank you. And for Section B what do you mean by
3 impacts in this statement?

4 A Here how what the concentrations were in the water.
5 So their release impacted the concentration in the
6 water is a better way to look at it perhaps.

7 Q Okay. I'm still a little confused as to what
8 precisely we're looking at. PCBs released into the
9 water. Were you looking at the impact on
10 concentrations over time of PCBs in the Hudson
11 River?

12 A Yes.

13 Q Was there a specific time period that you were
14 looking at?

15 A Essentially the time period for which there's data
16 available.

17 Q And what periods were those?

18 A Well, samples were started back in the late '60s
19 early '70s. Data was sporadic. And then of course
20 much more concentrated once we got into the 2006,
21 2007 timeframe.

22 Q What were the sources of the data that you looked at
23 concerning PCB concentrations in the river?

24 A It was collected by the New York State Health
25 Department, it was collected by the EPA and then

1 KIRK WYE BROWN, Ph.D.

2 ultimately it was collected by GE and their
3 contractors.

4 Q Turning to Section C, impacts in this section means
5 what?

6 A Means how did the concentrations in the water impact
7 the concentrations that were being picked up by the
8 water supply systems.

9 Q And what did you conclude with regard to that?

10 A Well, certainly that the PCBs were being picked up
11 by the water supply systems.

12 Q Which water supply systems were you looking at?

13 A Halfmoon, Waterford, Stillwater and yeah, I lost the
14 fourth one in my mind. There are four of them. For
15 some reason I'm drawing a blank on it. I'll come up
16 with it in a bit.

17 Q Okay. If you remember you can let me know. What
18 kind of impact did you conclude occurred with those
19 public water systems?

20 A Well, certainly the PCBs were being picked up and
21 were present in the water supply systems.

22 Q Do you recall what concentrations those PCBs were
23 present at in the water systems?

24 MR. BOYAJIAN: Objection to form.

25 A Not without looking back at the data.

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Q Do you recall what timeframes you saw these PCBs in the water supply systems?

A It would've been in the 2008, 2009 timeframe.

Q Okay. And any other timeframe?

A Not that I recall.

Q In Section D here what do you mean by impacts?

A Well, once they get into the water system then they're going to be distributed to the residents who drink them. So it's a matter of the health risks to those residents.

Q When you say once they get into the water system, are you referring to PCBs?

A Yes.

Q And what water system are you referring to?

A The water systems in question in this case, the Stillwater, Halfmoon, Waterford.

Q Okay. Are you aware that the Waterford plaintiffs and the Stillwater plaintiffs have settled their claims with the General Electric Company?

A I am.

Q So is it your intent to provide any opinions related to the claims brought by the Stillwater plaintiffs and the Waterford plaintiffs in this case?

A No. And I got my mind around the fourth plaintiff,

1 KIRK WYE BROWN, Ph.D.

2 and that is the County of Saratoga and their water
3 supply district.

4 Q Okay. Are you referring to the Saratoga County
5 Water Authority?

6 A Yes.

7 Q Do you know when the Saratoga County Water Authority
8 went on line? When it first started serving water?

9 A I don't have an exact date in mind. It was in late
10 2010s. We don't have a name for that decade.

11 Q 2010 does that sound right?

12 A Well, right.

13 Q Do you have an understanding of where the Saratoga
14 County Water Authority draws its raw water from?

15 A Yes.

16 Q What is your understanding?

17 A Above the location where the river was polluted.

18 Q Okay. Do you know specifically that location?

19 A Yes. Moreau.

20 Q Moreau?

21 A Moreau, yes.

22 Q And so what impacts of PCBs were you looking at
23 related to Saratoga County Water Authority?

24 A Well, they had to make a decision as to where they
25 were going to take their water from the river. And

1 KIRK WYE BROWN, Ph.D.

2 the impact is that the presence of PCB influenced
3 their decision to take the water out above the
4 contamination.

5 Q How do you know that?

6 A Reading the reports that were done on the water
7 systems.

8 Q Which reports?

9 A There were a series of reports going all the way
10 back to '95 in which they were aware and mentioned
11 that the PCBs were consideration in where they
12 should get their water as they began to look at
13 water sources to supply the county.

14 Q Okay. In your original report here do you provide
15 any opinions to the effect of what you just stated
16 about the Saratoga County Water Authority?

17 A No.

18 Q Looking at part D you also state here that you're
19 looking at the impacts of PCBs released by the
20 General Electric Company facilities on the
21 continuing exposure of residents of the communities
22 along the Hudson River to PCBs. What do you mean by
23 exposure here?

24 A Well, exposure via drinking water, but their
25 exposure by other avenues certainly. Contamination

1 KIRK WYE BROWN, Ph.D.

2 of the air, contamination of fish in the river.

3 Q But for part D when you use the word exposure, you
4 were referring to the drinking water?

5 A That was a primary exposure, but there are others.

6 Q In preparing your initial report that we've marked
7 as Exhibit 1 did you communicate either in writing
8 or in conversation with either -- I'm sorry, with
9 any of the other plaintiffs' experts in this case?

10 A No, I did not.

11 Q How about as you prepared your rebuttal report that
12 we marked as Exhibit 2, did you communicate with any
13 of the other plaintiffs' experts in this case?

14 A I did not.

15 Q In preparing either of your reports did you review
16 any of the other reports by plaintiffs' experts in
17 this case?

18 A Yes.

19 Q Whose reports did you review?

20 A I reviewed the reports of, and I have them right
21 here. That's the best way to do it. Johnson,
22 Shifrin, Warner and Connolly.

23 Q And so you just mentioned --

24 MR. BOYAJIAN: Go ahead. You're going
25 follow-up?

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Q Yeah. You just mentioned experts who are defense experts. Is that your understanding?

A Yes. Right, right.

Q And I want to get to that but my question to you was -- we'll start again.

In preparing your original expert report that we are marked as Exhibit 1, did you review any of the other reports prepared by plaintiffs' experts in this case?

A No.

Q In preparing your rebuttal report did you review any of the reports by plaintiffs' experts in this case, either rebuttal or initial reports?

A Not that I recall.

Q Are you relying on any of the opinions expressed by any of the other plaintiffs' experts in this case?

A No.

Q Now, sorry to cut you off earlier when you were telling me the reports that you had reviewed that were defense expert reports. Did you have additional ones?

A The four that I mentioned were the ones that I reviewed.

Q Did you review those in preparation for your

1 KIRK WYE BROWN, Ph.D.

2 rebuttal report?

3 A Yes.

4 Q Did you attend the deposition of Robert Michaels
5 yesterday?

6 A I did.

7 Q Did you attend the entire deposition?

8 A No.

9 Q What time did you leave the deposition,
10 approximately?

11 A Approximately an hour before it was over is my
12 understanding.

13 Q Do you remember what time of day you left?

14 A It would have been approximately 3:30.

15 Q Did you find it helpful to attend Mr. Michaels
16 deposition in preparation for your own today?

17 MR. BOYAJIAN: Objection to the form.

18 A It may be. We'll find out.

19 Q When you left yesterday did you find that experience
20 to have been helpful in your preparation for today's
21 deposition?

22 MR. BOYAJIAN: Objection to the form.

23 A It didn't impact it one way or the other. I still
24 did my preparation.

25 Q Did Mr. Michaels state any opinions at his

1 KIRK WYE BROWN, Ph.D.

2 deposition with which you disagreed?

3 MR. TEDESCO: Objection to form.

4 A No.

5 Q Did you discuss Dr. Michaels testimony with him at
6 any point during his deposition or breaks during his
7 deposition?

8 A No.

9 Q Did you discuss Mr. Michaels testimony with him
10 after his deposition was completed?

11 A No.

12 Q Was yesterday the first time that you met
13 Mr. Michaels?

14 A Yes.

15 Q Are you relying on any opinions expressed by any
16 experts in this case about whether the use of the
17 Hudson River as a source of drinking water will pose
18 health risks to the citizens of Halfmoon after the
19 dredging project is over?

20 A I guess the question kind of depends on whether or
21 not they will continue -- they'll go back to using
22 the water from the Hudson River after the dredging
23 project is over.

24 Q Why does your response to whether you're relying on
25 any opinions expressed by other experts depends on

1 KIRK WYE BROWN, Ph.D.

2 whether Halfmoon goes back to using the Hudson River
3 as their drinking water source?

4 MR. BOYAJIAN: Objection to the form.

5 A Well, if they don't go back to using it then the
6 questions is answered. They won't have continuing
7 health impacts. If they do go back to using it in
8 my opinion they will have then continuing exposure
9 which could have health -- adverse impacts on their
10 health.

11 Q Okay. My question to you, Dr. Brown, is -- let's
12 start this way. You have looked at some number of
13 expert reports in this case other than your own;
14 correct?

15 A Right.

16 Q And of the expert reports that you have looked at
17 are you relying on any opinions contained within
18 those reports about whether the Hudson River will
19 pose health risks to the citizens of Halfmoon if
20 they go back to using the Hudson River?

21 MR. BOYAJIAN: Objection to the form.

22 A No, I'm not relying on other experts for that. I
23 have my own opinion on that.

24 Q Okay. And what is your opinion on that?

25 A That they will continue to suffer exposure and

1 KIRK WYE BROWN, Ph.D.

2 health risks if they go back to using the river
3 water.

4 Q When you say they will continue to suffer exposure
5 what do you mean by that?

6 A Well, they've already been exposed over time.

7 Q And it's your opinion that if the Town of Halfmoon
8 goes back to using the Hudson River its customers
9 will be further exposed to PCBs?

10 A Yes.

11 Q And it's also your opinion that if the Town of
12 Halfmoon goes back to using the Hudson River that
13 its customers will be at risk of adverse health
14 effects?

15 A Yes.

16 MR. TEDESCO: Object to the form.

17 Q And what's the basis of your opinion that there's a
18 risk of adverse health effects to the customers of
19 the Town of Halfmoon if they use the Hudson River?

20 A Ingestion of PCB contaminated water increases the
21 probability of cancer and other health risks.

22 Q And how do you know that?

23 A From reading the literature, from my studies, from
24 my awareness of this problem for decades.

25 Q What literature have you looked at?

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2 A Well, certainly the most recent one was the
3 International Agency on Research on cancer made a
4 statement. But I've followed carefully over the
5 years the various sets of data that are utilized to
6 determine whether a chemical is a potential
7 carcinogen or whether it's a carcinogen, and I know
8 that process well. Actually, I've been a reviewer
9 for the ATSDR for making that determination on
10 certain chemicals.

11 Q Are you a toxicologist, Dr. Brown?

12 A I have not -- I don't have a degree in toxicology,
13 but I have in fact worked on various components of
14 toxicology over the years.

15 Q Over the years have you worked on components of
16 toxicology related to human health risks associated
17 with PCBs?

18 A Not specifically PCBs, but I have worked on many
19 other chemicals.

20 Q But not PCBs?

21 A Not PCBs.

22 Q Are you an epidemiologist?

23 A No.

24 Q Do you have epidemiological training?

25 A No.

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2 Q Have you published any articles on the human health
3 effects of PCBs in peer reviewed literature?

4 A I have not.

5 Q So following up on this discussion we've been
6 having. Can you turn to page 44 please of your
7 original report which we marked as Exhibit 1.

8 A Yes.

9 Q I'll be there in a second. And I'm looking at
10 specifically here at Section 4.11 entitled
11 Alternative Water where you state that, "It is your
12 opinion that until all of PCBs already in the river
13 in the sources of PCBs still entering the river have
14 been identified and removed including those in the
15 well field at Stillwater, an alternative water
16 source that is proven and reliable must be available
17 to the Village of Stillwater and Towns of Waterford
18 and Halfmoon to protect against the risk of
19 unacceptable amounts of PCBs threatening the water
20 supplies." Now, we've already discussed that
21 insofar as your opinions here are towards the claims
22 of the Stillwater plaintiffs and the Waterford
23 plaintiffs, you won't be offering those opinions at
24 trial; correct?

25 A That's correct.

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2 Q So focusing on the Town of Halfmoon. Is it your
3 opinion that until there are zero PCBs in the river
4 it is unsafe for the Town of Halfmoon to provide
5 drinking water through its water treatment plant to
6 its customers?

7 A Yes.

8 Q Do you have an opinion as to when Halfmoon's
9 exposure to PCBs started?

10 MR. TEDESCO: Objection to the form.

11 A I'd have to look back at the record.

12 Q What do you need to look back at?

13 A I have to look back at something that said when
14 their water supply system was constructed.

15 Q Is it your opinion that as soon as the Town of
16 Halfmoon built their own water treatment plant and
17 started using it, they were exposed to PCBs?

18 MR. TEDESCO: Objection to the form.

19 A Once they began drawing from the river and supplying
20 that water, yes, I believe people would have been
21 exposed to PCBs.

22 Q Okay. Were you aware that prior to the Town of
23 Halfmoon using their own water treatment plant with
24 an intake in the Hudson River, that the Town of
25 Halfmoon had obtained water from Waterford?

1 KIRK WYE BROWN, Ph.D.

2 A Yes.

3 Q And do you know what Waterford's source of drinking
4 water was that was providing to Halfmoon?

5 A My understanding was it was the Hudson River.

6 Q Is it your opinion then that when the customers of
7 the Town of Halfmoon were taking water from
8 Waterford, which was coming from the Hudson River,
9 that the customers of the Town of Halfmoon were
10 exposed to PCBs at that point?

11 MR. BOYAJIAN: Note my objection to the
12 form.

13 A Yes.

14 Q Do you know when the Town of Halfmoon entered into
15 its contract with Waterford to take water from
16 Waterford?

17 MR. TEDESCO: Objection to the form.

18 A I don't have a -- I know that transition happened,
19 but I don't know the date.

20 Q If I represent to you that it was in the early '80s,
21 my recollection is 1981, although I could be wrong,
22 but it was in the early 1980s, do you have any
23 reason to disagree with that?

24 A No.

25 Q So is it your opinion that the residents of the Town

1 KIRK WYE BROWN, Ph.D.

2 of Halfmoon have been exposed to PCBs since the
3 early 1980s?

4 MR. BOYAJIAN: Objection to the form.

5 A Yes.

6 Q I'd like to turn now, and this will be a little bit
7 of a juggling act, to your resume, which is appended
8 to the back of your original report that we've
9 marked as Exhibit 1, in appendix one to that report,
10 along with your updated supplement to your resume
11 that we've marked as Exhibit 3. Looking at
12 Exhibit 1 in appendix one, this first document is
13 your resume; correct?

14 A That's correct.

15 Q And subject to the supplement that you provided this
16 morning, is everything else in this resume current
17 as far as you know?

18 A Yes.

19 Q On the first page of your resume you list here areas
20 of expertise. Is this a fair and accurate statement
21 of your expertise?

22 A Yes.

23 Q Is this section called areas of expertise fully
24 inclusive of the areas of your expertise or are
25 there other areas of expertise that are not stated

1 KIRK WYE BROWN, Ph.D.

2 here?

3 A Well, there's always you know interpretation of that
4 and expansion of that. For instance, I've listed
5 toxicity and risk assessment of soils, and I would
6 add water to that. So there's some things that I
7 might if I updated it add to it or.

8 Q And that's what I'm trying to get at, is what would
9 you add to it? You've told me that you would add
10 water to your expertise on toxicity of soils. And
11 is the entry that you're specifically thinking of
12 the toxicity and risk phase assessment of soil
13 contaminates to plant and animals or are you
14 thinking of a different --

15 A Well, plant, animals and humans.

16 Q Okay. So you would add humans to that?

17 A Yes.

18 Q And what soil contaminants are you specifically
19 referring to here?

20 A Essentially it's a very long list. Inorganic
21 contaminants, metals, salts and then organic
22 contaminants. I've studied all kinds of the impact
23 and what happens, fate and transport of what happens
24 to all kinds of organic chemicals, pesticides, oils,
25 organic chemicals, manufactured chlorinated organic

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2 chemicals. A whole series of things. In fact I
3 wrote a book for the EPA in the early '80s on how
4 these chemicals behave in the soil and how they
5 would enter the groundwater and how they would enter
6 the air from the soil.

7 Q Are there any other areas of expertise that are not
8 included here in your resume that you would include
9 if you were updating it?

10 A I don't here include expertise on DNAPLs, but that
11 certainly falls within the fate and transport and
12 movement in the soil, in the bedrock underneath the
13 soil, how they get from one location to another.
14 That would be another thing that I would add.

15 Q Okay. Anything else?

16 A Not that I can think of at this time.

17 Q Is there anything relevant to the opinions you're
18 offering in this case that is not included in your
19 resume?

20 MR. BOYAJIAN: Objection to the form.

21 A I don't believe so.

22 Q Subject to the additions that you just discussed
23 concerning your areas of expertise, does this
24 section called Area of Expertise accurately and
25 completely describe your expertise for purposes of

1 KIRK WYE BROWN, Ph.D.

2 consultings, including litigation?

3 A Yes, with the amendments that I made.

4 Q Okay. In your areas of expertise you don't list or
5 hold yourself out as an expert in the fate and
6 transport the PCBs in surface waters; correct?

7 A Not specifically surface waters. But the
8 distinction here is not very great because what
9 one's looking at is surface waters are just -- you
10 can look at them as soils with just a whole lot more
11 water in them. So when you look at the chemistry of
12 them and how things partition and how they move, so
13 you're right, I didn't specifically list surface
14 waters. But that's one that certainly could be
15 added. I've done that in other cases.

16 Q Is it your opinion that the fate and transport of
17 PCBs through surface waters behaves exactly like the
18 fate and transport of PCBs in soils?

19 MR. BOYAJIAN: Objection. Misstates the
20 witness's testimony.

21 A No. I didn't say exactly. I'm saying the same --
22 some of the same relationships are used to describe
23 how the chemicals partition between the sediments,
24 the oils that are in the system and the water. The
25 movement is controlled differently because now we

1 KIRK WYE BROWN, Ph.D.

2 have velocity of water flowing, erosion and that
3 type of thing, and certainly I've studied those in
4 other contexts.

5 Q What other contexts have you studied those?

6 A Well, I've worked in -- I studied the movement of
7 PCBs in particular in the Delaware River. That was
8 for a particular litigation case, Metal Banks.

9 Q Maybe I can orientate you towards that in your
10 listing here. And I'm going to use the listing in
11 your original supplement, but if there's something
12 in your original resume which you supplemented
13 relevant to that case, will you point me to it?

14 A I shall.

15 Q Okay. So on let's see here, if we look at page 11
16 of your original report.

17 A Yes.

18 Q It says in the last paragraph towards the bottom
19 that...

20 MR. BOYAJIAN: I just want to make sure
21 that I'm looking at the right thing just before
22 you proceed. Not in the appendix. On the
23 body.

24 MS. WADHWANI: Yeah, page 11 of the body.

25 MR. BOYAJIAN: Okay. Thank you.

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2 BY MS. WADHWANI:

3 Q The last sentence of page 11 that bleeds over onto
4 page 12 says, "I have studied the partitioning of
5 PCBs into non-aqueous phase liquids associated with
6 the Delaware River at the Metal Bank of America
7 Superfund site in addition to the fate and transport
8 of PCB containing oils in the mud flats and river
9 banks of the Delaware River." Is that what you were
10 just referring to?

11 A Yes.

12 Q And what specifically were you studying here?

13 A Metal Banks had a piece of property which was
14 actually filled into the Delaware River, kind of a
15 peninsula stuck out into it. And they were a metal
16 recyclers. So what they did was they were breaking
17 and opening transformers at that location in order
18 to recover the metals. And the PCBs were either
19 spilled or escaped from them onto the soil. And
20 then some of them, very low concentrations, bled
21 into the Delaware River. And then I also looked at
22 the other sources of PCBs in the Delaware River at
23 that point. There were some up-gradient sources
24 from some creeks, there were also immediately south,
25 so down-gradient. There was a source meaning right

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2 next to the peninsula, there was a drain that was
3 bringing water in that had PCBs in it. And so I was
4 trying to look at the relative contribution of these
5 various sources.

6 Q And so was the work that you describe here on pages
7 11 and 12 of your original report part of your work
8 in 2001 and 2002 on the United States versus Union
9 Corp. Metal Bank and Con Ed of New York case that
10 you listed on page 24 of the appendix two to your
11 original report?

12 A Yes.

13 Q Now, you note in the appendix that you were retained
14 in that case by the defendants. Were you retained
15 by both Metal Bank and Con Ed of New York or just
16 one of them?

17 A I believe just Metal Bank.

18 Q And what were your opinions in that case?

19 A My opinions were that the site did contribute to PCB
20 loaded in the river, but the concentrations that
21 were being released from the site were far lower
22 than the concentrations which already were in the
23 river. So in fact the contribution was diluting
24 what was already in the river.

25 Q How did you arrive at that conclusion?

1 KIRK WYE BROWN, Ph.D.

2 A Essentially doing calculations as to the amount that
3 was being discharged from the other sources as well
4 as the amount being discharged from this source.

5 Q And how were you able to calculate the various
6 amounts being discharged across the different
7 sources?

8 A The flow rates and the drainage rates were used in
9 the concentrations.

10 Q The flow rates of what?

11 A Of the streams entering that had PCBs in them and
12 then the draining drape from the Metal Bank site.

13 Q And what kind of information did the flow rates give
14 you that allowed you to arrive at your opinion?

15 A The mass that was entering the system.

16 Q And I see that you were deposed in that case as
17 well; correct?

18 A I was, yes.

19 Q And that that testimony took place in May 2002?

20 A Yes.

21 Q And that you also provided trial testimony later in
22 2002?

23 A Yes.

24 Q At deposition or at trial did you offer any opinion
25 in the case in addition to the ones that we've

1 KIRK WYE BROWN, Ph.D.

2 already discussed?

3 A I'd have to go back and look at it. I don't recall.

4 Q Were there any opinions that you offered in your
5 reports or in your deposition in that case that you
6 were not permitted to testify to at trial by the
7 court?

8 A Not that I recall. No.

9 Q Since your work on that case in 2002 have you
10 provided any consulting outside of this matter
11 related to PCBs?

12 A I've done consulting on other cases where PCBs were
13 involved, other locations that didn't turn into
14 cases. They were either settled or for some other
15 reason. But I've worked on other sites where PCBs
16 had been a consideration.

17 Q And was your consultancy work at those sites
18 specific to PCBs or were PCBs just part of the
19 issues that were going on and you were working on
20 the other issues?

21 A PCBs were part of the issues.

22 Q Okay. And those were part of the issues that you
23 were specifically engaged to work upon?

24 A Right.

25 Q Can you tell me about those projects?

1 KIRK WYE BROWN, Ph.D.

2 A The one that comes to mind is the Krejci site in
3 Ohio.

4 Q What was going on with that site?

5 A It was a site where I believe it was a drum recycler
6 and they had spilled things around and PCBs on the
7 soil, and PCBs were among them. And the question
8 was what was the risk, how should it be cleaned up,
9 who was responsible.

10 Q And were those the three questions that you were
11 specifically looking at?

12 A That's what I was looking at. Yes.

13 Q Were you looking at any other questions related to
14 PCBs for the Krejci site?

15 MR. BOYAJIAN: Objection to the form.

16 A Movement, how far they move, and what the risk was
17 of them moving off site.

18 Q And what was the environmental media in which the
19 PCBs were moving?

20 A That was soil.

21 Q And what did you ultimately conclude?

22 A We did the study and we were working towards a
23 report and then they settled, so we never really got
24 there.

25 Q Okay. Any other projects that you've worked on

1 KIRK WYE BROWN, Ph.D.

2 related to PCBs besides the Krejci site, the Metal
3 Bank case and this case?

4 A No. Those are the three projects that I recall.
5 They've been peripheral in many other sites that
6 I've worked on, because I worked on a couple dozen
7 Superfund sites and PCBs often show up. But none
8 that really stick out where that was the focus.

9 Q Okay. Do you have any background in chemical
10 engineering?

11 A Yes.

12 Q Are you licensed as a chemical engineer?

13 A I'm not.

14 Q What's your background in chemical engineering?

15 A I've taken courses, graduate courses in chemical
16 engineering.

17 Q You took those as part of your graduate work?

18 A I did, yes. And they were very valuable to me
19 throughout my career.

20 Q Have you had any training or courses since your
21 graduate time in chemical engineering?

22 A No.

23 Q What about environmental engineering, did you take
24 any courses as part of your graduate work in
25 environmental engineering?

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A When I was a student there were no courses in environmental engineering. In fact I developed some of the courses in environmental studies that engineers took.

Q What courses did you develop?

A I developed a course in the land disposal of waste.

Q Okay.

A That was taken by engineers.

Q Any other courses that you developed?

A Remediation of contaminated land.

Q Anything else?

A Those are the two.

Q And when did you teach these courses, what timeframe?

A In the late '70s through 2000.

Q Okay. And going back for a moment to the Krejci site. When was the work that you did for that performed?

A I believe it would have been the late 1990s or early 2000s. But in that timeframe.

MS. WADHWANI: Okay. Why don't we take a break.

VIDEOGRAPHER: One moment please. Off the record at 10:06 a.m.

1 KIRK WYE BROWN, Ph.D.

2 (There was a short recess in the proceedings.)

3 VIDEOGRAPHER: On the record at 10:22 a.m.

4 BY MS. WADHWANI:

5 Q Dr. Brown, I just want to quickly look with you at
6 Exhibit 3 that we marked today, which was the
7 supplement to your resume and appendix one that you
8 brought in, and it looks like the supplement, the
9 supplement of the testimony that you've provided?

10 A Yes. An update of it.

11 Q Could you tell me specifically what was updated
12 here?

13 A Specifically on page five the case that's listed is
14 number 84 in August, deposition in August of 2013.

15 Q Have you provided an expert report in that case?

16 A Yes. And that is probably also listed -- well, I
17 know I did an expert report in that case.

18 Q Sure. Can you just summarize for me quickly what
19 the nature of the opinions are in this case, Burnia
20 versus, is that pronounced Fluor?

21 A Yes, Fluor. This is a case involving lead
22 contamination, and lead and soils. And my testimony
23 was concerning the concentration -- how the -- what
24 the sources of that lead would've been and the
25 concentrations and then how they would be taken up

1 KIRK WYE BROWN, Ph.D.

2 by children in residence in that area.

3 Q And by taken --

4 A How they would be exposed.

5 Q And when you say how they would be exposed, what
6 does that mean?

7 A Well, the ingestion of soil and exposure to dust.

8 Q Are you, strike that.

9 Have you offered any opinions in that case
10 related to the potential health effects upon those
11 children of exposure to lead?

12 A Yes.

13 Q What's the nature of those opinions?

14 A Well -- and my problem is I've given several
15 testimonies on that topic. There's good evidence
16 that ingestion of lead contaminated soils has an
17 inverse -- adverse impact on an individual's IQ.

18 Q And is that the nature of your testimony in this
19 case?

20 A Yes.

21 Q This Burnia case. Okay. Do you have an
22 understanding as to whether the Hudson River was
23 considered a safe source for drinking water in the
24 1990s and 2000s before dredging began?

25 MR. BOYAJIAN: Objection to the form. You

1 KIRK WYE BROWN, Ph.D.

2 can answer.

3 A I know it was being used. I'm not aware of the
4 considerations of that at that -- prior to dredging.
5 I know there were PCBs in it, I know there were
6 certainly detections of PCBs in some of the drinking
7 water sources. Some of the drinking water supplies
8 I should say. And when I got involved in the case a
9 major emphasis was what would happen during
10 dredging.

11 Q I take it from your earlier testimony that you
12 disagree that the Hudson River was a safe source of
13 drinking water in the 1990s and 2000s?

14 A I do.

15 Q Do you remember what concentrations were that you
16 saw in the 1990s of PCBs in the Hudson River?

17 MR. TEDESCO: Objection to the form.

18 MR. BOYAJIAN: Objection.

19 BY MS. WADHWANI:

20 Q You can answer.

21 A Yeah, there were a variety of concentrations that I
22 saw. Some of them as high as a thousand.

23 Q From the 1990s?

24 A Yes.

25 Q Can you please turn in your original report that

1 KIRK WYE BROWN, Ph.D.

2 we've marked as Exhibit 1 to page 19?

3 A Yes.

4 Q And the first opinion that you offer in this report
5 is in Section 1 entitled PCBs Longevity and
6 Lifetime; correct?

7 A Yes.

8 Q And your opinion states, "It is my opinion that any
9 PCBs remaining in the river environment will impact
10 all forms of life in the river ecosystem, including
11 the inhabitants that live along the river and those
12 in the municipalities that rely on the Hudson River
13 below Fort Edward as a source of water." Can you
14 explain what you mean here?

15 A Well, the PCBs are long-lived compounds. So they're
16 going to be persistent in this environment. And
17 they are distributed throughout the ecosystem so
18 that they're in the algae, they're in the benthic
19 organisms, they're in the fish as well as being in
20 the water, the sediments, the river bank sediments,
21 the flood plains, the air, these evaporate into the
22 air. So anyone living along the river certainly has
23 potential for exposure, and then those drinking from
24 the river, using the river as water source could be
25 exposed.

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2 Q And what do you mean by impact here?

3 A Impact -- what I mean is an adverse impact, that
4 they're going to have some deterioration of the
5 systems because of the presence of the PCBs.

6 Q Of what systems?

7 A Well, the ecosystem and certainly in situations
8 where these are then concentrated, for instance, in
9 the fish, have adverse impact there as well as
10 people who consume the fish.

11 Q And what kind of deterioration?

12 A The ecosystem, when these type of chemicals are
13 released in the ecosystem not only are they taken up
14 but there are changes in growth pattern and that
15 type of thing that are not normal.

16 Q Growth pattern of what?

17 A Well, I haven't studied the literature thoroughly in
18 that area, but it's my understanding that the
19 ecosystem is deteriorated when it's contaminated
20 with chemicals of this nature, PCBs.

21 Q The entire ecosystem or what specifically? I'm just
22 trying to understand your opinion.

23 A Well, components of it. Certainly the higher ends
24 of fish are deteriorated.

25 Q And by deteriorated you mean they're physically

1 KIRK WYE BROWN, Ph.D.

2 deteriorating or there are less? The population has
3 gone down? I'm trying to understand what you mean
4 by deteriorated here in this context.

5 A That's what I'm saying, the population has gone
6 down, they don't grow as well, they don't reproduce
7 as well.

8 Q And what is the impact on the municipalities that
9 rely on the Hudson River below Fort Edward as a
10 source of water?

11 MR. TEDESCO: Objection.

12 A Well, those who are drinking the water, then the
13 PCBs are deposited in their body where they
14 accumulate in fatty tissues.

15 Q Which tissues do they accumulate in?

16 A Lipophilic tissue, lipids. So they're in the
17 lipids, the fats.

18 Q In your opinion what's the effect of this lipophilic
19 accumulation?

20 A Well, a couple of things. One is once it's in the
21 body it accumulates, and not -- very little of it is
22 excreted. So you get a lifetime accumulation of
23 these chemicals. So it's cumulative. And that has
24 adverse impacts on various end points for health,
25 including cancer, hormone behavior and that type of

1 KIRK WYE BROWN, Ph.D.

2 thing. And then the other thing is that it can then
3 be excreted through breast milk to infants.

4 Q To your understanding has anyone in this case
5 brought a claim alleging that they have been
6 diagnosed with cancer as a result of PCB exposure?

7 MR. BOYAJIAN: Objection to the form.

8 Q You can answer.

9 A I'm not aware of individual toxic tort lawsuits.

10 MR. BOYAJIAN: Well, just for the record,
11 this case doesn't involve any natural persons.
12 They're municipalities.

13 MS. WADHWANI: I understand what this case
14 involves.

15 MR. BOYAJIAN: Okay.

16 BY MS. WADHWANI:

17 Q To your knowledge has anyone in the Town of Halfmoon
18 been diagnosed with cancer as a result of PCB
19 ingestion?

20 MR. TEDESCO: Objection.

21 MR. BOYAJIAN: Objection to the form.

22 A I've not looked into that.

23 Q So sitting here you don't know either way --

24 A Yes.

25 Q -- about the human health effects of PCB ingestion,

1 KIRK WYE BROWN, Ph.D.

2 if any, upon the customers of the Town of Halfmoon's
3 water?

4 MR. TEDESCO: Object to the form.

5 A Not on those individuals. But I do know that from
6 toxicological studies the ingestion of PCB increases
7 the risk. So their risk -- they've been impacted in
8 the sense that their risk has to get cancer, for
9 instance, has been increased by ingesting the PCB
10 contaminated water.

11 Q By what fold has their cancer risk been increased?

12 MR. TEDESCO: Objection to the form.

13 A I've not done a calculation of that.

14 Q Okay. What would you need to do to develop such a
15 calculation?

16 A You'd have to look at the data over time as to what
17 the concentration trends were.

18 Q Concentration trends in what?

19 A Well, in the water.

20 Q The finished drinking water?

21 A Yes. And also then you would want to add in other
22 exposure pathways, the air, fish consumption,
23 exposure to the flood plain, that type of thing to
24 do a risk assessment. Then you could come to a
25 calculation.

1 KIRK WYE BROWN, Ph.D.

2 Q Would you also have to know what an individual's PCB
3 body burden was?

4 A That's another way of going at it, but I have not.
5 I don't have experience in that area.

6 Q Okay. And what's the basis for your opinion here in
7 Section 4.1?

8 A Well, one basis is that once its in the river, those
9 that are trapped in the river...

10 Q By trapped you mean PCBs?

11 A PCBs. In the sediment and the oils that are in the
12 sediment, they're going to last for a very long
13 time. So if this was just a flush and it all flowed
14 down the river, the problem would be over. But
15 these things are in the river, they're also still in
16 the bedrock, they're also still in the soils at the
17 plant sites. The contaminants that are in the
18 soils, the PCBs that are in the soils, and the PCBs
19 that are in the groundwater at the sites and in the
20 DNAPL at the sites, which is a component of
21 groundwater, will continue to be a source into the
22 river. So we have ongoing sources and we have
23 sources that already have been disbursed down the
24 river. Those are going to be very long-term. So
25 that's one part of the component because in order to

1 KIRK WYE BROWN, Ph.D.

2 get harm, it's concentration over time. So there's
3 the time factor. So that's one basis.

4 Q I'm sorry just to interrupt. What do you mean that
5 in order to get harm it's concentration over time?

6 A Well, if you have a very short exposure to
7 something, then since these are accumulated in the
8 body, you get body burden. Well, a very short
9 exposure will increase your body burden a little
10 bit. But since you have -- people who would be
11 drinking water or living near the water will be
12 exposed over a period of time. That's where you get
13 the large buildups and concentration in your body
14 and the greatest harm.

15 Q Okay. So over what period --

16 MR. BOYAJIAN: I don't think the witness
17 was done with his prior answer. So...

18 Q I apologize.

19 A I was done.

20 MR. BOYAJIAN: Okay. I'll take your word
21 for it that you were done.

22 A Sure.

23 Q I thought you were done too, but I apologize if I
24 interrupted you.

25 What levels of PCBs does one have to be

1 KIRK WYE BROWN, Ph.D.

2 exposed to to create the risk of harm?

3 MR. BOYAJIAN: Objection to the form.

4 A In my view any exposure increases your risk of harm.

5 Q And what's the basis for that view?

6 A The MCL Goal is set at zero. And the reason why the
7 MCL Goal is set at zero is there's no known
8 concentration, low concentration at which there's no
9 harm detected. So the concentration that you want
10 to be exposed to is zero.

11 Q You think that any concentration over zero PCBs
12 carries with it the risk of cancer?

13 A I do.

14 Q What other adverse effects, risk of adverse effects
15 do you think any exposure to PCBs above zero
16 carries?

17 A Besides risk of cancer?

18 Q Correct.

19 A There are a whole series of adverse effects that
20 have been listed. But you know some of them are
21 found at higher concentration levels. And I haven't
22 made a study as to how low they would go, but there
23 was this horrible instance in Japan where people
24 consumed PCBs because it was mixed with the oil they
25 were using to cook with.

1 KIRK WYE BROWN, Ph.D.

2 Q Is that the Yusho incident that you're referring to
3 in the late '60s?

4 A Yes, right. And they list about 20 things that
5 happened to people who did that, pigment change in
6 their skin and acne type exposures on their skin and
7 that type of thing. But that was a single high-dose
8 exposure. I don't have the expertise to say how far
9 down you have to go for those type of things to
10 happen. But I do know that there are other adverse
11 impacts at some exposure level.

12 Q Okay. Do you know what levels of PCBs one has to be
13 exposed to to increase their risk of cancer?

14 A Well, I already said that I think anything over
15 zero.

16 Q Okay.

17 A And the reason I think that is because it only takes
18 the alteration of one chemical reaction in your body
19 to be impacted by one molecule of PCB to cause a
20 change which can lead to cancer.

21 Q So then what is that interplay between your view
22 that any exposure over zero PCBs can increase the
23 risk of cancer with your view concerning the
24 short-term exposure versus long-term exposure?

25 A Well, I'm saying in the short-term exposure you get

1 KIRK WYE BROWN, Ph.D.

2 a whole list of other problems, a short high-dose
3 exposure. But any exposure increases your risk of
4 cancer in my view.

5 Q Okay. Are there specific medical or scientific
6 articles you're relying upon for that view?

7 A There are articles that I've read and rely on. I
8 can't pull the author and the dates up at this time.
9 But certainly the recent statement from the cancer
10 research group International Agency Research on
11 cancer, supports that opinion.

12 Q Are you talking about the 2013 IRC statement?

13 A Yes.

14 Q Any other bases for your opinion here in 4.1 on page
15 19 of your original report?

16 A I think we've covered them pretty well.

17 Q Okay. If you could turn please to page 26.

18 A Yes.

19 Q And I'm looking here at your opinion, 4.3, entitled
20 Dredging Failure. And you state here that, "It is
21 my opinion that even with re-dredging it is unlikely
22 that all certification units in Phase 2 will meet
23 the residual standard for closure of the
24 certification units." Correct?

25 A Right.

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2 Q What's the basis for your opinion here?

3 A Well, first of all, as it was pointed out by, I'm
4 not sure I'm pronouncing this right, Doody.

5 Q That's the correct pronunciation. It's D-O-O-D-Y.

6 A Okay. He says that even with careful operations
7 you're going to leave some behind. And we certainly
8 saw that in Phase 1 where the certification, many of
9 the -- well, a majority of the certification units
10 were above the standard that was set one milligram
11 per kilogram. So then they went in and covered them
12 with a cap. And so you leave these behind. In my
13 view caps are own temporary solutions. They will
14 erode away over time. So those even in the
15 certification units, anything left there is still a
16 source that can come into the river.

17 Q Okay.

18 A The other thing about covering them, they're
19 covering them with a layer of sand and then rock.
20 There is water exchanged between the sand and the
21 rock. The PCBs that remain in the sediment will
22 slowly partition into the water and diffuse up
23 through the sand around become part of the river.
24 So they will be -- they will eventually erode away,
25 most of them in my opinion, but even without that

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2 erosion they will be a continuing source of PCBs
3 into the river water.

4 Q And the erosion, are you referring here to the
5 capping?

6 A The capping, yes. So the capping is not PCB proof
7 and it's only temporary.

8 Q Okay. Do you think that General Electric has
9 engaged in carefully operations in its execution of
10 the dredging project so far?

11 MR. BOYAJIAN: Objection to the form.

12 A It's my view that dredging is a difficult thing to
13 do, and that there's no way you're going to get it
14 all. As far as careful operations, that's a
15 relative thing. I'd like to think they're doing
16 their best to try to get it out of the river.

17 Q Do you have any reason to believe GE is not doing
18 its best?

19 A As far as removal I think they're trying to remove
20 it. As far as what's going on after -- during and
21 after removal, I think they're doing some things
22 that are wrong, that misrepresent what's actually
23 going on.

24 Q Such as?

25 A I think the biggest problem is the -- their

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2 redeposition studies. Certainly during Phase 1 the
3 redeposition studies I think were perfectly done.
4 You put pans out there and catch it, and then you
5 know what's being redeposited. In Phase 2 they've
6 changed their sampling method. Instead of setting
7 pans out, they're taking a 5-centimeter layer of
8 soil before and sometimes it wasn't exactly before,
9 it was three days after they started, but the idea
10 take a 5-centimeter sample before and after dredging
11 downstream of the site where you're not dredging,
12 and then from that calculate well, how much did the
13 concentration increase over that dredging time.
14 That's a completely wrong way of doing that.

15 Q Why is that in your opinion?

16 A Because you're mixing anything that came in was
17 deposited from dredging with that that's already
18 there and you'll never be able to detect an increase
19 by that method.

20 Let me lay it out for you a little bit
21 clearer. During Phase 1 the pans downstream of
22 dredging were catching sediment that was as high as
23 120 or more milligrams per kilogram in the sediment
24 that deposited right after dredging. Now, if you
25 take a 5-centimeter layer of soil and it has

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2 20-milligrams per kilogram and then you dredge and
3 them come back and right next it take another
4 sample, hopefully not in the same hole, but right
5 next to it take another sample, you'll have the
6 original 20-milligrams per kilogram, and the
7 deposition of that that came out of the dredging,
8 the maximum of which was 120, the average was down
9 more like 40, so you put a very thin layer of 40 on
10 the top and then you take a 5-centimeter sample and
11 instead of that being a concentration of 20 that you
12 started with, it's something like 20.0 or 20.2. And
13 so you're diluting this higher concentration that
14 came in with the stuff that was there originally,
15 and as a result you'll never be able to show whether
16 or not dredging redeposited on that sample, because
17 statistically you can't see that number.

18 So the way to do it is the pans, I guess
19 they didn't like the result, so then they went to
20 this system where they're diluting anything that's
21 redeposited, and now they're saying, well, nothing
22 of significance is redeposited. They got the data
23 in Phase 1 and I think that's the reliable way of
24 doing it. I don't believe the data from Phase 2.

25 So to answer -- back where we started, I

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2 think they're doing what they can to dredge it.

3 It's not easy. And they are removing PCBs from the
4 river, and we could talk about whether or not we
5 think that's appropriate. But I think they're
6 misleading people on what's being transported
7 downstream and what's being redeposited downstream.

8 Q Do you know why GE conducted the Phase 2 downstream
9 deposition studies in the way it did?

10 A I haven't traced that back.

11 Q Do you know whether the EPA accepted the data from
12 the Phase 2 downstream deposition studies?

13 A They may have, but that doesn't give it credibility
14 if the method is wrong. Just because the EPA
15 accepted it or even approved the method, that
16 doesn't carry any water with me.

17 Q So you criticize the downstream deposition studies?

18 A Yes.

19 Q And are you aware that there was coring of the
20 Hudson River in Phase 1 dredged areas prior to the
21 start of dredging?

22 A Yes.

23 Q And that concentrations of PCBs were measured in
24 those sediment cores prior to the start of dredging?

25 A Yes.

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2 Q And so why can't you use these background cores as a
3 comparator against what was taken to determine
4 downstream deposition studies after dredging had
5 occurred?

6 A Well, first of all, the system is very heterogenous.
7 So if you take a core and you move over a foot and
8 you take another core, you're going to get different
9 answers. So you can't go back to the same location
10 and say this was our baseline. You got to do it by
11 some kind of a big averaging system. And that
12 doesn't really give you an answer because the
13 variability is so great. So there's no good way to
14 go from those cores to cores later on or samples
15 later on and say look, there's been a change or
16 look, there's not been a change. It's just too much
17 dilution and too much heterogeneity to be able to do
18 that.

19 Q Do you have any other criticisms of the way that GE
20 has conducted the dredging operations?

21 A Well, I said I didn't -- you know, I wasn't
22 criticizing their dredging operations. I was
23 criticizing how they presented what happened during
24 and after dredging. You know you could look at it,
25 and certainly the committee that looked at it after

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2 the initial dredging Phase 1, they made a batch of
3 recommendations. I thought those recommendations
4 were well put. I guess the other criticism is that,
5 you know, they are discharging more downstream than
6 was originally hoped or originally planned for. So
7 they changed those standards and upped them. It
8 kind of goes back to it's a difficult process. It's
9 sloppy. There's no way to make it not sloppy.

10 Q Dredging in general is a sloppy process?

11 A Dredging in general is a sloppy process. And
12 initially when I was brought on this case I was
13 asked to form opinions on dredging, and my opinion
14 was that you shouldn't do it because they're in
15 place and they're being released slowly. And if you
16 did it, it's going to impact the drinking water
17 sources downstream. Well, that came to fruition.

18 Q So you disagree with the EPA's decision to order
19 dredging?

20 A I don't disagree with it. My point is that once
21 they decided to dredge, they should've immediately
22 provided everybody with an alternative water source.

23 Q Why is that?

24 A Because there's no question in my mind, once you
25 started dredging, the concentrations go up. And

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2 certainly the data support that, during dredging and
3 then sporadic occasions, high flow in particular.
4 Between dredging we still have these high
5 concentrations.

6 Q And when you say high concentrations, what do you
7 mean?

8 A We've had concentration over 500.

9 Q Do you know how many times there were concentrations
10 over 500 during Phase 1?

11 A I didn't count them.

12 Q Do you know during any point in dredging how many
13 times the 500-parts per trillion standard has been
14 exceeded?

15 A Again, I didn't count them. But you know, 500 is in
16 my view an artificial number anyway. It has no
17 meaning for risk assessment.

18 Q Why is that?

19 A Well, the risk assessment for PCBs that should've
20 been used to set the standard results in a
21 concentration of 34-micrograms per liter.

22 Q Why do you think that's the appropriate level?

23 A That's the level that the EPA used to set the risk
24 for most hazardous substances. One excess cancer
25 per million. And that's the risk that they

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2 should've used. But the problem is number one,
3 analytical capabilities are not good enough to
4 consistently have samples analyzed at that level.
5 And number two, to get there would have cost a lot
6 of money and time. And so they set an arbitrary
7 number.

8 Q You think the EPA set an arbitrary number?

9 A It's definitely an arbitrary number. It has no
10 relation to risk assessment.

11 Q You understand that the federal MCL standard for
12 drinking water of PCBs is 500-parts per trillion;
13 correct?

14 A Yes, that's what I just said. And I disagree with
15 that. And the idea is that hopefully eventually
16 they will revise that to the appropriate number.

17 Q And you understand that the New York State
18 Department of Health regulations set 500-parts per
19 trillion as the standard for drinking water?

20 A That's one interpretation. They've also set a 90
21 part per trillion for waters that would be
22 discharged into the state and have also indicated to
23 communities that 90 is the appropriate number to use
24 for drinking water.

25 Q What's your understanding of what the 90-part per

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2 trillion standard is trying to achieve?

3 A Minimize the pollution of water.

4 Q Of all waters?

5 A Well, that's set for surface waters and groundwater.

6 Q And do you have an understanding of the purpose
7 behind setting 90-parts per trillion as the water
8 quality?

9 A It's to be more protective than the 500.

10 Q More protective for what purposes?

11 A For protecting the waters of the state so they can
12 be used for drinking.

13 Q Is it your understanding that that's a drinking
14 water standard?

15 A It's a discharge standard. And so you can interpret
16 it, you know, if they don't want you drinking -- if
17 they don't want you discharging more than 90, it
18 kind of implies that they're trying not to allow
19 that source to be contaminated more than 90 because
20 they want it that way for drinking water. So it's
21 kind of a roundabout way. But part of it in my view
22 is to protect drinking water.

23 Q And do you know for a fact that that's why New York
24 State set a 90-parts per trillion standard for water
25 quality?

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2 MR. BOYAJIAN: Objection to the form.

3 A I don't know. I haven't dug back into that to know
4 why they did it. But certainly everything I've read
5 indicates that that's what their objective was.

6 Q Here on page 26 under 4.3 Dredging Failure I'm
7 looking at the second full paragraph at the end
8 where you cite some statements from Mr. Doody in
9 2001, specifically the last sentence which reads,
10 "The residuals left behind after dredging may be at
11 a higher concentration and more bioavailable than
12 before dredging resulting in increased risk." Do
13 you know if it is in fact happened during the
14 dredging of the Hudson River that the residuals are
15 at higher concentrations and more bioavailable than
16 before dredging?

17 A Well, certainly if you look at the redeposition
18 samples from Phase 1, which as I said I believe were
19 taken appropriately, there are the concentrations
20 that were found right on the surface where the
21 chemicals would be more bioavailability -- more
22 bioavailable, would result in increased risk.

23 Q Are the residuals left behind after dredging at
24 higher concentrations then they were prior to
25 dredging?

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2 A Well, we know that they were as high as 120
3 something milligrams per kilogram in some samples.
4 I don't know what the concentration was there before
5 that sample. But when you compare that to the goal
6 which was to get it down to 1-milligram per
7 kilogram, some of the samples were 100 times over
8 that. So there's a high concentration that was
9 redeposited downstream in my view. Also, and part
10 of what he was saying here I believe and what I was
11 relying on, is that even though you dredge it's so
12 heterogeneous that you don't get it all. So there's
13 going to be some hot spots that you miss. You
14 just -- even with their efforts of developing prisms
15 and going back and resampling, there's going to be
16 some hot spots that you don't get. That's just the
17 nature of the beast.

18 Q And by heterogeneous, you're talking about the
19 nature of the river and the river dynamics?

20 A And the pattern in which the PCBs were deposited as
21 a result of the nature of the river and the river
22 dynamics.

23 Q And why does the heterogeneity of the river and the
24 pattern of PCBs mean that you can't get them all?

25 A Because there always going to be pockets that you

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2 missed with your sample. Because the concentration
3 can change from one foot to another as you go
4 through it. And despite the fact that they've taken
5 a lot of samples, you never get it all.

6 Q Is that true of any dredging project?

7 A I believe it would be. Yes.

8 Q Can you please turn to page 27?

9 A Yes.

10 Q And I'm looking at the first full paragraph, the
11 first sentence of that first full paragraph on page
12 27, which says, "Results from Phase 1 of the
13 dredging project clearly show the deficiencies of
14 dredging as the mechanism for the removal of PCB
15 contaminated sediments." Do you think that the
16 Hudson should not have been dredged?

17 MR. BOYAJIAN: Objection. Asked and
18 answered.

19 A I think that once entering in dredging you have to
20 then do something for the water supplies. Now,
21 there is -- the good reasons for trying to decrease
22 the source of a contaminant, and that's what they're
23 trying to do, they're trying to remove the PCBs from
24 the river, that has the advantage of then there's
25 less in there to continue to contaminate the water.

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2 But it has a disadvantage of while it's going on.
3 After it's going on the concentration are going to
4 be higher than they were before and also that's
5 going to move downstream. So the answer to that
6 question is rather complex because you have to look
7 at -- half the people are going to look at what's
8 going to be the impact downstream on the ecosystem,
9 what's the impact of these things going out into the
10 ocean where they're eventually going. So to get to
11 an answer to that is very complex. I understand why
12 the EPA wants to remove them and I think there's
13 probably some long-term advantages to removing them.
14 But it's the short-term disadvantages that we're
15 having to deal with here.

16 Q Okay. I apologize, I'm not sure your answer to my
17 question here. Taking on balances. The advantages
18 and disadvantages as you have stated them, do you
19 think the Hudson should or should not have been
20 dredged as a remedial action to deal with the PCBs?

21
22 MR. BOYAJIAN: Note my objection. I
23 believe it's been asked and answered. You can
24 try again.

25 A My thinking is that it's good to remove the

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2 materials that are in the river. I would say we
3 need to also clean up the materials that have
4 potentially to get into the river that haven't
5 gotten there yet. They've done some of that but not
6 all of it. I think that should be intensified. My
7 concern on the other side is that by dredging part
8 of it, just gets moved down river and there can have
9 an adverse impact. If you balance it, in the end I
10 think probably dredging removal is appropriate.

11 Q Okay.

12 A Because we have high populations of people here
13 potentially continuously exposed through ongoing
14 lifetimes, and we can help it a little bit by
15 getting that out of there. Others may have the
16 other view that it does more damage than good.

17 Q I was just asking about your view.

18 A Yeah.

19 Q Could you please turn to your rebuttal report, which
20 we marked as Exhibit 2 to page 24.

21 A Yes.

22 Q And here again in section -- let me just make sure
23 on I'm on the right section. Okay. Yes. 5.3, page
24 24. If you look at the final paragraph of that
25 section and as you've talked about earlier today you

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2 state here in the last sentence, "Because of this
3 uncertainty," and by uncertainty you're referring to
4 this heterogeneity or dynamacism of the Hudson
5 River, the variability and flow and velocity and
6 therefore the uncertainty of predicting the erosion
7 of riverbed and cap, "Because of this uncertainty
8 the resuspension and downstream migration of the
9 residual PCBs will always be a threat." In your
10 opinion what is the likelihood that residual PCBs
11 throughout the dredging project will be resuspended
12 and migrate downstream?

13 A Well, I think the data from Phase 1 clearly
14 demonstrates that they are resuspended and migrate
15 downstream.

16 Q And how far down?

17 A I know that they've migrated beyond where they've
18 dredged. I haven't made an attempt to plot how far
19 they've gone. But the problem is that those that
20 are redeposited then are in a position to more
21 easily be resuspended when there's a turbulent event
22 or stream flow changes, and then they can also be
23 carried downstream. It's kind of a hopscotch
24 system. Once -- they'll just keep on moving
25 downstream.

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2 Q But here are you talking about the resuspension of
3 PCBs moving downstream upon resuspension?

4 A Yes.

5 Q Okay. And what I'm focusing on here from page 24 of
6 your rebuttal is going back to also in the
7 statements that you made earlier where you thought
8 that the potential for erosion of backfilling and
9 capping was a serious potential risk that eventually
10 those PCBs would find their way back up and migrate
11 downstream; correct?

12 A Yes.

13 Q So I'm not talking about the resuspension and
14 movement of PCBs downstream from resuspension. Here
15 I'm talking about your view that capping is not a
16 long-term solution because of the potential for PCBs
17 to come up through the cap.

18 A Yes.

19 Q And then be resuspended and move down. Do you
20 understand the distinction I'm making?

21 A Yes.

22 MR. BOYAJIAN: I just want to clarify for
23 the record. Were you referring before to on
24 page 24, did you say Section 5.4 or were you
25 referring to 5.3?

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2 MS. WADHWANI: 5.3.

3 MR. BOYAJIAN: I misheard you then. I'm
4 sorry.

5 BY MS. WADHWANI:

6 Q It's okay. You understood I was talking about 5.3?

7 A Yes.

8 MR. BOYAJIAN: The last sentence on 5.3 on
9 page 24?

10 MS. WADHWANI: Correct.

11 MR. BOYAJIAN: I'm sorry. Thank you for
12 that clarification.

13 MS. WADHWANI: You're welcome. Do you
14 need some more coffee?

15 MR. BOYAJIAN: No. But when you take a
16 break, let me know. Don't go too long.

17 BY MS. WADHWANI:

18 Q Okay. So keeping in mind that we're talking now
19 about the potential down the road for residual PCBs
20 to come through the capping and the backfill, in
21 your opinion what is the likelihood that that will
22 happen?

23 MR. BOYAJIAN: Objection to the form.

24 A Well, the likelihood that they will partition into
25 the water and as soluble PCBs come up through the

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2 cap is 100 percent. That will happen. There's no
3 way you can prevent that.

4 Q What's your basis for saying that?

5 A My understanding of the basic principles from my
6 studies, including my chemical engineering classes,
7 which say that these things, these chemicals
8 partition to try to achieve an equilibrium. So if
9 you have a soil particle that has some PCBs attached
10 to it and you expose that to clean water, some
11 fraction of that PCB will then dissolve in the
12 water. The inverse also happens. If you have
13 a cell particle that has some PCBs on it and you put a
14 concentration in the water that's higher than the
15 equilibrium concentration, it will go from the water
16 to the soil particle. So it's a dynamic
17 relationship. And in fact that's going to happen.
18 There's no way to prevent that.

19 Q And how is that the PCBs that are currently capped
20 as part of the dredging project being exposed to
21 water?

22 A The pores in the cap. They're filled with water.

23 Q Do you know what materials the caps are made out of
24 that GE has used during the dredging project?

25 A The materials include rocks, I heard four-inch rocks

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2 on the surface, and then layers of sand or soil, and
3 it doesn't really make any difference what those
4 are. They're going to allow PCBs to migrate through
5 them.

6 Q To your knowledge have any of the caps eroded so far
7 to the point that PCBs have migrated through the cap
8 and moved down river?

9 A Let me help by making a distinction here. What I'm
10 saying is that they'll come up through the cap no
11 matter what. You don't need erosion. But I'm also
12 saying that eventually they'll erode away. Now,
13 there was some observations that there was some
14 disturbance of the cap in a high flow event. But
15 this is an old river, we have situations where
16 storms come through that dump massive amounts of
17 water into it, it comes up on the flood plain, and
18 during those storms, those sporadic events there are
19 instances where we get enough energy in the river,
20 enough flow that it will erode away parts, if not
21 all, of some these caps reexposing the PCBs that
22 were not removed by dredging.

23 Q So is it your opinion today that PCBs underneath the
24 caps that were put into place during Phase 1 and
25 Phase 2 have already come up through those caps

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2 irrespective of whether erosion has happened or not?

3 A Some of it already has.

4 Q How do you know that?

5 A The basic principles of partitioning and diffusion
6 will allow them to move them up through the cap.

7 Q So your view is that just basic principals mean it
8 has inevitably already happened?

9 A Yes.

10 MS. WADHWANI: We have to change the disk.

11 VIDEOGRAPHER: One moment please, at 11:14
12 a.m, this is the end of disk one. Disk two
13 will follow.

14 (There was a short recess in the proceedings.)

15 VIDEOGRAPHER: At 11:20 a.m. on
16 April 16th, 2014 this is disk two of the sworn
17 testimony of Kirk Brown, Ph.D. Please proceed.

18 BY MS. WADHWANI:

19 Q Since we've been talking so much about your opinions
20 on capping, I thought we should just turn to those
21 sections of your report and consider them more
22 fully.

23 So in your original report, which we
24 marked as Exhibit 1, it's my understanding that your
25 discussion of capping starts on page 28 and carries

1 KIRK WYE BROWN, Ph.D.

2 over to page 30. Is that section entitled 4.4
3 Erosion where you discuss your opinions on capping,
4 Dr. Brown?

5 A Yes.

6 Q And then in your rebuttal report, which we marked as
7 Exhibit 2, your discussion of capping is on page 26;
8 is that correct?

9 A Yes, that's correct.

10 Q Okay. And you state here in your report that it's
11 your opinion that capping of residual PCBs in the
12 closed certification units is only a temporary
13 solution to the containment of PCBs. Resuspension
14 of the river bottom sediments is inevitable and will
15 result in the release of PCBs into the water column
16 and their transport down river. And we've already
17 talked about a little bit this morning that you view
18 the suspension as inevitable for at least two
19 reasons. One, you think that regardless of whether
20 the caps erode or not there will just be migration
21 of PCBs up through the caps into the water column?

22 A Yes.

23 Q And then the second is that you think the caps will
24 eventually erode; correct?

25 A Yes.

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2 Q And you think that both those processes are
3 inevitable; is that right?

4 A Yes.

5 Q Is there any other process besides the natural
6 movement of PCBs and the erosion of the caps that
7 you think will cause these residual PCBs to
8 resuspend and move downstream?

9 A No. I think those are the two mechanisms that we
10 need to be concerned about.

11 Q And I think you said earlier that regardless of the
12 materials of which the caps were made, you would
13 still have these dual concerns; correct?

14 A Yes.

15 Q Are you aware that the caps that GE has been using
16 have been engineered to withstand high flows in a
17 100-year flood?

18 A Yes, that's my understanding.

19 Q And does that understanding influence your view at
20 all?

21 A No. Those are engineering standards, and that's the
22 way things are designed. But we can get a 500-year
23 flood tomorrow if we had a front coming or a
24 hurricane coming, and the caps are not designed to
25 withstand that.

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2 Q Do you know when the last time the Hudson River
3 experienced a 500-year flood, if at all?

4 A I haven't looked into that. But I know that it
5 would've happened in the past and it will happen in
6 the future.

7 Q Do you know when in the past it would've happened?

8 A I don't. I haven't looked back at the record to see
9 when.

10 Q Okay. Can you say sitting here today that a
11 500-year flood has happened in the last 50 years in
12 the Hudson River?

13 A I can't say. I haven't looked at it.

14 Q Can you predict sitting here today when, if at all,
15 such a flood would take place in the future?

16 A If I could predict such things I would instead
17 predict the stock market. So no one can predict it.

18 Q Are you aware that monitoring, maintenance and
19 repair of the caps installed in Phase 2 is required
20 of GE in perpetuity?

21 A I'm aware of that.

22 Q And that doesn't have any influence on your
23 opinions?

24 A No.

25 Q Do you agree that capping is an acceptable method for

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2 remediating Superfund sites?

3 A It's a method that's accepted, it's been used.
4 Mainly it's been used on surfaces, land surfaces,
5 not -- and only infrequently in beds -- in water.
6 And usually when it's been in water it's been in
7 still water or lakes where there's not this
8 potential for high flows and disruption.

9 Q Are you aware that the National Research Council of
10 the National Academies of Science concluded in 2007
11 that capping will be part of remediation of all
12 Superfund mega sites?

13 A I believe that's in their recommendations.

14 Q Okay. Does the National Research Council compose of
15 a group of people who are experts in their field of
16 study?

17 A I would have to say yes because I've served on
18 several of their committees.

19 Q And that was going to be my next question is, you
20 have served on the National Research Council in the
21 past; correct?

22 A Yes, dealing with some of these same issues.

23 Q And do you consider the National Academies of
24 Science to be a reputable entity?

25 A I do.

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2 Q As part of your work on the National Research
3 Council have you participated in any of these, and
4 you'll correct me if I'm using the wrong
5 terminology, but sort of panels gathered together to
6 look at specific issues? Is panel the correct way
7 to describe it?

8 A Yes, that's a good way to describe it. Yes, I have.

9 Q Okay. On any of the panels for which you served on
10 the National Research Council have they addressed
11 PCBs?

12 A I'm trying to roll back through.

13 Q Sure. Take your time.

14 A There were several of them.

15 Q Would it help to look at your resume?

16 A No. I know which panels I served on. I don't
17 believe any of them directly involved PCBs.

18 Indirectly in the sense that one of the panels that
19 I served on was assessing the effectiveness of the
20 Superfund program and the permanents of the
21 solutions and whether the hazardous ranking score
22 had been applied properly and that type of thing.
23 So we looked at a range of sites which had a range
24 of contaminants, and PCBs may have been in that list
25 of contaminants that we were looking at.

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2 Q That was more for the purposes of assessing the
3 Superfund program; correct?

4 A Right.

5 Q Had nothing to do with actually assessing Superfund
6 sites related to PCBs for remediation purposes?

7 A That's right. And other panels that I served on it
8 was assessing cleanups. I don't recall that PCBs
9 were a component of that.

10 Q Okay. When you served on panels for the National
11 Research Council did any of them assess or evaluate
12 the effectiveness of sediment dredging?

13 A No.

14 Q When you were coming to your opinions concerning the
15 caps, in your view that the caps will eventually
16 fail, were you relying on any scientific literature
17 for that opinion?

18 A Well, not so much scientific literature as an
19 understanding of the dynamics of the Hudson River.
20 I have seen it immediately after flood stage. I've
21 been upstream of it after Irene and saw boulders as
22 big as the chair you're sitting on that have been
23 rolled down some of those tributaries to the Hudson
24 River. The river when it goes wild, and it happens
25 occasionally, will redistribute materials within the

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2 river, moves them downstream. In fact there are
3 even calculations of how much material moved down
4 the Hudson River, and it's massive amounts of
5 material. And there are times, episodic times when
6 boulders and rocks will be moved. So 4-inch stones
7 are not going to stay in place. It's just the fact
8 of the matter, you look at the river at places that
9 expose bedrock, obviously they're not dredging
10 there. Other places they're sediments, they're
11 sediment on the right bank and the left bank and
12 these move with time back and forth and reposition.
13 And so there's enough energy in the river to pick up
14 large masses of material and move them from one
15 location to another always moving them downstream.
16 So I mean the caps are designed for the 100-year
17 flood, and I'm not criticizing the design of the
18 caps, but what I'm saying is they're not permanent.

19 Q Okay. And I just want to clarify something that you
20 just said. Is your view on the effectiveness of
21 capping on lack thereof in your opinion in this case
22 specific to the dynamics of the Hudson River, or do
23 you believe that as a general remedial plan capping
24 is a bad idea?

25 A I didn't say capping was a bad idea.

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2 Q That's what I'm trying to clarify.

3 A I focused on this river. It will delay the release
4 of PCBs. No question about it. It will not prevent
5 the release of PCBs.

6 Q Okay. You mentioned as part of the basis for in
7 your opinion concerning what will happen to the
8 Hudson River based on its dynamics with regard to
9 the capping, some of your personal observations of
10 the Hudson River, as well as some calculations I
11 think you said?

12 A Yes, calculations done by others. I didn't do them.

13 Q And what calculations were those?

14 A Oh, boy. And I don't even know who did them. U.S
15 Geological Survey or somebody has done calculations
16 of sediment load going down the river. And I looked
17 at those, but I can't pull a reference up or the
18 specifics of it. I just know that those
19 calculations have been done.

20 Q So you don't recall the date of those calculations?

21 A No, I don't.

22 Q And what do you calculations of the movement of
23 sediment downriver have to do with the durability of
24 capping in the Hudson River?

25 A Well, my view of the capping material would become

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2 eventually part of the sediment moving downriver.

3 Q And that's irrespective of whatever kind of material
4 is used in the caps?

5 A Right.

6 Q Do you recall the last time you looked at these
7 calculations that you believe were the U.S.G.S
8 calculations?

9 A No. It's sometime in the last four to six months,
10 but I couldn't give you a date.

11 Q Did you rely on them in the development of your
12 opinions in your rebuttal and your report concerning
13 capping?

14 A They're just a supporting element.

15 Q Besides your personal observations and these
16 U.S.G.S. calculations did you rely on anything else
17 for your view that the Hudson River dynamics will
18 eventually lead to the erosion of the caps?

19 A Well, that and personnel observations made. Yeah.

20 Q Anything else?

21 A No.

22 Q I'd like to turn now to page 36 of your expert
23 report. And what I'm going to focus on here
24 Dr. Brown is your opinions contained in the section
25 marked 4.7, Sampling and Monitoring. And I'd

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2 actually like you to first turn to page 37 and I
3 just want to take you to 36 to see what opinions you
4 were discussing here. And I'm looking at the second
5 full paragraph that starts, "As specified in the
6 Community Health and Safety Plan." Are you with me
7 on that paragraph?

8 A Thirty-seven?

9 Q 37, second full paragraph.

10 A Oh, got it. Yes.

11 Q And I'm focusing specifically here on the last two
12 sentences of that paragraph which read, "Since a
13 composite sample is essentially a time-weighted
14 sample, composite sampling will not provide
15 information on temporal conditions or short-term
16 spikes in concentration of the water column.
17 Composite samples will not guarantee that
18 representative concentrations of PCBs in the water
19 are measured." Did I read that correctly?

20 A Yes.

21 Q Do you hold yourself out as an expert in the
22 monitoring of PCBs in surface waters?

23 A I have expertise in monitoring surface waters. I
24 have not personally done it for PCBs. But I've
25 looked at lots of samples from other sites where

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2 surface water have been monitored in. I've done
3 some sampling myself.

4 Q And my question is, do you hold yourself out as an
5 expert in monitoring of PCBs in surface waters?

6 A Monitoring surface waters, not PCBs. I haven't done
7 it, but my expertise from other activities carries
8 over onto PCBs.

9 Q So if someone were to call you tomorrow and say
10 Dr. Brown, do you have expertise in the monitoring
11 of PCBs in surface waters, what would you tell them?

12 MR. BOYAJIAN: Objection to the form.

13 A I have expertise in monitoring surface waters. I've
14 done it for many chemicals and I would be happy to
15 adds PCBs to the list.

16 Q All right. Have you ever designed a monitoring
17 program for PCBs in surface waters?

18 A Not for PCBs.

19 Q Have you ever implemented a monitoring program for
20 PCBs in surface waters?

21 A I have not.

22 Q Have you ever designed a monitoring a program for a
23 dredging project?

24 A I have not.

25 Q Have you ever implemented a monitoring program for a

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2 dredging project?

3 A I have not.

4 Q Is it your understanding that the monitoring program
5 adopted by the EPA and GE for the dredging project
6 includes both manual and automated sampling
7 techniques?

8 A I am.

9 Q Is it your opinion that the monitoring protocol
10 approved by the EPA for the dredging project was
11 inappropriate for monitoring PCB concentrations in
12 the Hudson River during the dredging on seasons?

13 MR. BOYAJIAN: Objection to the form.

14 A They're some things that are, you know, you might
15 consider inappropriate where the samples were taken,
16 for instance with reference to water intakes and
17 that type of thing. So that might be criticized.
18 But monitoring in a river this dynamic is not an
19 easy thing. And you know these people who designed
20 this supposedly had expertise. But in fact when you
21 look at the record you find that they tried this and
22 it didn't work, they tried that and it didn't work,
23 they tried something else and it didn't work, and
24 then they finally settled on an approach. So I
25 don't know where their expertise was so great that

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2 they couldn't find the right way -- the one that
3 they landed on the first time.

4 But my criticism more than that is that
5 when it comes to the water supply that people are
6 going to be drinking, the river is heterogenous.
7 You take a sample at one time in one location and
8 that's not going to tell you what's deeper in the
9 water, next to it in the water or what's going to be
10 taken up by the water uptake. The problem is it's
11 just a very complicated system. There's one set of
12 data that show that clearly where they took a series
13 of water samples across the river. One side was
14 non-detect. Near the other shore it was over
15 1200-micrograms per liter. Okay. Well, if the
16 water supply had been near that shore over there
17 where it was 1,200 and it was taken up, it would be
18 twice the 500 we're talking about, plus a little
19 bit. If you took an average of those, does that
20 mean that's what the water supply would've been
21 taken up. That's the problem. It's so
22 heterogeneous that anyway you sample it, you're not
23 going to be able to provide assurance that at some
24 other point or some other time you're not going to
25 have a much higher concentration, that is a

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2 potential being taken up by water supply.

3 Q Okay. And is that what you mean when you say it's
4 not an easy thing to monitor PCB concentrations of
5 the Hudson River?

6 A Right.

7 Q Okay. And you mentioned just a couple of minutes
8 ago that you -- insofar you had criticisms, the
9 monitoring program one of them would be the sampling
10 locations. What is your criticism of the sampling
11 locations?

12 A Well, I think it would've been -- they did it at
13 Waterford. That is attach a sample to an intake
14 pipe. I think that would've been appropriate for
15 other intake pipes on the river.

16 Q Which intake pipes?

17 A Well, the intake pipe for Halfmoon would have been
18 appropriate. Of course at Stillwater you can't get
19 an intake pipe. But I think that would've been
20 appropriate. Also I notice that at Stillwater there
21 were long periods of time and off seasons where they
22 didn't take water samples. Of course Stillwater is
23 no longer using the water, so that may have been the
24 reason for that.

25 Q And why do you think that there should've been

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2 monitoring at the intake at Halfmoon?

3 A Well, because that's the water that would be taken
4 up for the -- by the water treatment plant.

5 Q Okay. Do you have any reason to believe that the
6 water at the Halfmoon intake at any given time would
7 be substantially different in concentration than the
8 water at Waterford intake?

9 A Well, we see situations where the concentrations
10 measured downstream sometimes were higher than the
11 ones measured upstream.

12 Q And what was the distance between the downstream and
13 upstream monitoring stations that you're referring
14 to there?

15 A I don't have a number on the distance. I'd have
16 look back at it.

17 Q Was it more than a couple of miles?

18 A I'd have to look at it. I don't recall.

19 Q Do you know how far the Halfmoon intake is from the
20 Waterford intake?

21 A No.

22 Q Would the distance between those two intakes have
23 any influence on your opinion that Halfmoon
24 should've had a monitoring station attached to it?

25 A When they were taking water out -- if they were

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2 going to take water out, they should have a sampler
3 there.

4 Q If who was going to take water out?

5 A Halfmoon.

6 Q Is it your understanding that Halfmoon has taken any
7 water from the Hudson River during the dredging on
8 seasons?

9 A I don't have an understanding of that. No.

10 Q You don't know either way what Halfmoon has done?

11 A Not during the dredging season. I don't recall.

12 Q Okay. Are there any other criticisms that you have
13 besides the sampling locations at the monitoring
14 stations?

15 A Well, they ran into problems. And it's a typical
16 situation where you're taking samples out of a river
17 and you're sampling device gets fouled, gets flooded
18 up with vegetation and other things. I think they
19 could have developed sampling devices that minimize
20 that problem if you put a bigger screen around it,
21 it helps minimize the problem. But they're aware of
22 those problems and trying to deal with them.

23 Q Any other criticisms?

24 A No. The main problem is it doesn't represent what's
25 going to be pulled in.

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2 Q How much bigger of a screen would you have
3 recommended that GE put on the monitoring stations
4 to prevent the fouling up?

5 A It minimizes it. It doesn't prevent it.

6 Q Sorry. To minimize.

7 A Yeah. And you can make screens a foot in diameter
8 or so it and just helps decrease the problem. It
9 doesn't do away with it, but that's a technique that
10 I've used in the past.

11 Q Do you know what size the screens were that GE used?

12 A From the visual evidence they look very small to me.

13 Q And what visual evidence are you referring to?

14 A The photos.

15 Q The photos of monitoring stations?

16 A Yes.

17 Q Do you know if a screen that's a foot in diameter
18 would have fit onto the monitoring stations?

19 A Oh, yes.

20 Q And what's your basis for saying that?

21 A The river is big enough to hold something a foot in
22 diameter.

23 Q Right. The river is, but what about the monitoring
24 stations themselves?

25 A Well, you just attach it to the end that so that you

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have a screen that's keeping the fouling material out of the smaller area where you're sucking the water in.

Q Okay.

MS. WADHWANI: Let's take a break.

VIDEOGRAPHER: One moment please. Off the record at 11:46 a.m.

(There was a short recess in the proceedings.)

VIDEOGRAPHER: At 12:03 a.m -- p.m., sorry, this is -- we're back on the record.

BY MS. WADHWANI:

Q We were talking about before we took the break your criticisms of the monitoring station for -- excuse me, during the dredging on season. Do you have these same criticisms for the dredging off seasons with regards to monitoring?

A Well, it's still a problem that the river is so heterogeneous.

Q And the problem with the heterogeneity of the river just exists as a matter of fact; correct?

A Right.

Q So there's nothing that anyone can do about that?

A Right. So it's difficult to monitor it. But you know when you get a series of samples, and some of

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2 them are 300 and some of them are over 500, and then
3 when I average that and say well, it's under 500, to
4 me that's not showing the picture, because the
5 picture is there's a spot out there that is likely
6 500 or more. And the way the data is handled is
7 also in my view and the way the standards were set
8 up to handle the data is not as protective as it
9 should be.

10 Q How protective should it be?

11 A Well, we're out of that business now in that no one
12 is using the water anymore. So you know you'd have
13 to apply standards other than human consumption.

14 Q What standards would you apply?

15 A Well, then you're looking at standards for fish and
16 ecosystems and that type of thing.

17 Q Do you disagree with the current standards in Phase
18 2 related to the fish and the Hudson River
19 ecosystems?

20 A I haven't formed opinions on that.

21 Q Do you know what work or activities GE undertook
22 prior to 2009 to satisfy itself and EPA that
23 composite sampling was representative of the river
24 conditions?

25 MR. BOYAJIAN: Just note my objection to

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2 the form.

3 A I have a memory of some activities there, but I
4 can't pull it up. I don't remember exactly what
5 they did concerning composite samples.

6 Q Did you look into that question?

7 A I don't recall looking at that.

8 Q Okay. Have you seen the results, the data that
9 resulted from the activities GE undertook prior to
10 2009 to test the composite sampling and monitoring
11 stations?

12 A I recall reviewing those, yes.

13 Q Do you remember from what years that data was
14 derived?

15 A No. Other than re-dredging I don't recall what
16 years it was.

17 Q And did that data influence your opinions in your
18 report?

19 A Well, if you're trying to get the average going down
20 a river, probably a composite sample is your only
21 choice. But the composite sample averages the low
22 numbers with the high numbers. So if you're trying
23 to find out whether there's going be a location
24 where there's a high concentration which could be
25 harmful to somebody, then the composite sample isn't

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2 over space or time, doesn't give you that
3 information.

4 Q Why is composite sampling you're only choice for
5 monitoring conditions as they move down river?

6 MR. BOYAJIAN: Objection to the form.

7 Misstates the witness's response, but you can
8 answer.

9 A The composite sample at least you're taking several
10 samples to say get somewhat of an average. But by
11 putting them all together, which is what a composite
12 sample is where you put them all together, you've
13 eliminated your high values. So they don't show.
14 So you're not showing a true picture of the
15 potential for exposure from use of the river water.

16 Q So what different type of monitoring protocol do you
17 think GE and EPA should have adopted?

18 A I don't think any monitoring protocol is going to
19 give you results that are going to be protectant, no
20 matter what you do. Because you can't -- you can't
21 take enough samples to get a true picture of what's
22 going down the river.

23 Q Why not?

24 A Because it's so heterogeneous.

25 Q And so if GE or EPA had consulted with you in say

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2 2006 about the monitoring protocol that they should
3 adopt for the dredging project, what would you have
4 said?

5 A Well, I would have said that whatever monitoring you
6 do, you're not going to be protective of water
7 supplies. That's number one. So if you want to
8 find out what the dredging is doing, your only
9 choice is to use the best systems available. And
10 they would be some kind of a sampling system where
11 you looked at individual samples. In some cases
12 if -- but if there's nobody taking the water from
13 the river, then that's not near as necessary. And
14 then you could go to some time and space composites.

15 Q Do you think that GE used the best systems
16 available?

17 MR. BOYAJIAN: Objection to the form.

18 A Well, they used the standard systems. And I haven't
19 done a detailed review of it, but I -- you know the
20 ISCO water sampling system. I knew those people
21 that were running that company back in 1965, and
22 they make good samplers. I think they did the best
23 they could and they're continuing to do the best
24 they could. But what I'm saying is -- and it's
25 probably okay as long as no one is drinking the

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2 water from the river. If they're drinking the water
3 from the river, then I would have suggested changes.

4 Q What changes would you have suggested?

5 A Well, more detailed sampling right around where
6 people would be withdrawing the water. But then the
7 problem is there's always turnaround time, so you
8 can't tell them turn your water system off. So I
9 think that the course of action that was taken is
10 the best, get out of the river. And well, the
11 samples are what they are. They help us understand
12 something, but not all of it.

13 Q And you agree that some sort of sampling and
14 monitoring program was necessary for the dredging
15 project?

16 A I think yes.

17 Q How many samples do you think should have been taken
18 per day at the water intakes?

19 MR. BOYAJIAN: Objection to the form.

20 Misstates the witness's prior testimony, but
21 you can answer.

22 A I haven't attempted to do a calculation of that to
23 figure out what would be appropriate.

24 Q Okay. And the laboratory turnaround time that you
25 mentioned.

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2 A Right.

3 Q That response time and what a lab is capable of,
4 that just exists regardless of whether there's
5 dredging or not; correct?

6 A Right. And I would say they've done a good job of
7 getting that down as far they can. I give them
8 credit for that. But still if the water is already
9 in somebody's drinking water system and you notify
10 them, well, it's a little late.

11 Q Okay. Is there a sampling method you believe could
12 be used to capture the concentrations of PCBs
13 absorbed to sediments that are moving downriver with
14 the bedload?

15 A Well, the system that was used in Phase 1 I think is
16 the appropriate one, put a pan out and capture the
17 materials that are redeposited.

18 Q Did the pans that were put out as part of the
19 deposition studies in Phase 1 in your opinion
20 capture the PCBs, absorbed sediments in terms of for
21 sampling purposes and data purposes?

22 MR. TEDESCO: Objection to the form.

23 A I would think so, yes.

24 Q And how about for capturing the levels of PCBs in
25 sheens?

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2 A That's always a very difficult one.

3 Q Why is that?

4 A Because the sheen is very thin, as thin as a
5 molecule or two. And getting a sample of that,
6 skimming it off the water, you're always going to
7 get water.

8 Q And so is there a way to differentiate the
9 concentration of PCBs in the water versus the
10 concentrations of PCBs in the sheen?

11 A If you could get a big enough sample, enough sheen
12 in there compared to water, you could allow it to
13 settle, the water settled and sheen float on top.
14 If you can get a big enough sample you could then
15 measure what's in the water, measure what's in the
16 sheen.

17 Q What's a big enough sample?

18 A Well, you'd have to have enough that you could run
19 it through your analytical procedures. And I don't
20 know exactly what that number is.

21 Q And how do sheens behave in a river system like the
22 Hudson River?

23 A Well, what happens is a free-phase liquid is
24 released at the some point below the water surface.
25 That free-phase liquid is going to be mostly oil,

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2 not PCBs. The PCBs are dissolved in the oil and
3 that comes up to the surface. When it hits the
4 surface it spreads out very quickly in a layer
5 that's just a couple of molecules thick. They're
6 all hanging onto each other. The example I was
7 going to give you is you probably don't know about
8 this is, but fire ants.

9 Q I know fire ants.

10 A Okay. Fire ants get on water, they kind of form a
11 mat. They all grab onto each other and form a mat
12 and then some of them climb on top, and those are
13 the ones that survive. The mat drowns. But you can
14 picture that same thing with molecules of these
15 chemicals spreading out. And then they get thinner
16 and thinner and some of it evaporates. And the ones
17 that are going to evaporate most easily are the oils
18 that are not PCBs, and then some of the PCBs
19 evaporate also. But then what's left is some of the
20 oil and some of the PCBs and they move downstream,
21 they may attach to something. Or if enough of the
22 oil evaporates, the PCBs will then sink back to the
23 bottom.

24 Q Okay.

25 MR. BOYAJIAN: I hope there's no fire ant

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lovers out there.

Q Do you know at what depth the water take -- excuse me, water intake is for Halfmoon for its water treatment plant when it uses the Hudson River?

A I don't have a -- I saw that somewhere, but I don't have an accurate memory of that. I don't recall what depth. I was thinking it was midway, but...

Q Okay. Now, you've reviewed the expert report of GE's expert John Connolly; correct?

A I have, yes.

MS. WADHWANI: Sorry. I'm going to take a moment to grab it. I'm going to mark as Exhibit 4 the expert report of John Connolly dated December 13, 2013.

(Brown Exhibit 4 was marked for identification.)

MR. BOYAJIAN: Does this have the updated tables that he put in after the fact?

MS. WADHWANI: I'm sorry, it does not. I apologize. I wasn't going to ask questions about --

MR. BOYAJIAN: That's quite all right.

MS. WADHWANI: -- those tables I don't believe.

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2 MR. BOYAJIAN: Now, he testified about
3 that. So if there comes a situation where that
4 comes up, just make it clear. I can't remember
5 what part of his testimony related to that.

6 MS. WADHWANI: Sitting here today I can't
7 remember either.

8 BY MS. WADHWANI:

9 Q I take it that you've read Dr. Connolly's expert
10 report in this case?

11 A I have.

12 Q Would you please turn to page 19...

13 A Yes.

14 Q Of his report. And I want to point to you
15 specifically to the last paragraph on page 19 which
16 reads, "The Town of Halfmoon intake is located on
17 the east shore of a manmade channel that connects
18 the downstream end of Lock 1 with the Hudson River.
19 This channel is isolated from the main flow of the
20 river. The source of the water reaching this intake
21 is either from occasional pulse flows from a lock
22 discharge or very low velocity backflow from the
23 main stem of the river below lock one. These flow
24 patterns would result in little, if any, transport
25 of bedload materials from the main channel of the

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2 Hudson River to the intake." Regarding the location
3 of the Town of Halfmoon's intake and the
4 characterization of the area of Halfmoon's intake,
5 do you disagree with anything that Dr. Connolly
6 states in that paragraph?

7 A No.

8 Q Are the statements in that final paragraph of page
9 19 fair and accurate to your knowledge?

10 A Yes. I have no reason to question them.

11 Q Can you turn please to page 28 of your rebuttal
12 report, which we marked as Exhibit 2. And in
13 Section 5.7 here on page 28 what is it in
14 Dr. Connolly's opinions that you are responding to?

15 A Well, he's claiming that there's no bedload movement
16 along the bottom of the river, and I think there is
17 bedload movement. It's a natural process by which
18 some of the materials in the bottom of river are
19 slowly moved downstream. I don't know why he would
20 conclude there's no bedload movement. And when
21 those materials contain PCBs or PCBs attach to a
22 particle, they will move downstream. So I think
23 there is bedload movement. And everything I've read
24 and seen indicates that that's an phenomena that
25 goes on in all of these rivers.

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2 Q Okay. And did you see in Dr. Connolly's report, and
3 we can certainly turn to it, wherein discussing this
4 issue of why he would think that PCB sediment in
5 bedload would not move downstream he noted that a
6 reason was that that the Hudson River is dammed at
7 seven locations between Fort Edward and Waterford.

8 A Right.

9 Q And I take it that you disagree that the dams would
10 have any effect on the movement of PCB sediment in
11 the bedload as it moved downstream?

12 A No. I agree they have an effect.

13 Q And what's that effect?

14 A The bedload builds up behind those dams. And then
15 during periods when there's a high-flow event, some
16 of that will be stirred up and taken over the dam.
17 And also these dams have locks adjacent to them.
18 And every time there's a flushing from the lock,
19 some of the sediment up-gradient of the lock will be
20 removed through and discharged down the river
21 probably too Halfmoon's intake.

22 Q Is it your opinion that the PCB containing sediment
23 from the bedload from the locks will go straight
24 into Halfmoon water intake?

25 MR. BOYAJIAN: Objection.

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2 A They go into the pool from which Halfmoon is
3 pulling. So the potential is certainly there.

4 Q And the bedload rests on the bottom of the river; is
5 that correct?

6 A Yes, moves along the bottom of the river.

7 Q You also state here on page 28 at the bottom in the
8 second paragraph in Section 5.7 that you disagree
9 with Dr. Connolly in that DNAPLs if present in the
10 sediments would not be collected in the water
11 samples collected in the monitoring system. And you
12 refer back to your original report concerning the
13 drawbacks of the monitoring system, including the
14 inability of a stationary monitor to capture sheens
15 or PCBs absorbed to sediments moving down river with
16 the bedload; correct?

17 A Yes.

18 Q Also on page 28 here you mention that highly
19 contaminated sediments below the dam contain PCBs at
20 concentrations that are greater than the
21 concentrations possible by partitioning from the
22 water column. And I'm just wondering if you can
23 tell me what that means?

24 A It means that just as we talked about before with
25 the caps. When there's PCBs in the soil, when

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they're in equilibrium with the water, the water will have a given concentration. And so to get over the dam, if the water is going over the dam and then recontaminating the sediment with the PCBs, what we're saying is you can't get high enough concentration in the water to raise the sediment to the concentrations that are occurring on the downside of the dam. So it's saying somehow PCBs got over the dam. And one way is this episodic stirring and some of the sediments where PCBs go over the dam. They have to get over the dam somehow. Another possibility is that during disturbances or at other times a sheen is formed. And there have been reports of sheens on the Hudson River in the absence of dredging. And in fact I've personally seen sheens on the Hudson River in the absence of dredging. When that sheen comes up behind the dam and then that water goes over the dam, you can almost never see a sheen when it's going over the dam. It's too quick. And then that gets on the other side, the light oils that caused it to float evaporate and the PCBs go down to the bottom. So's another mechanism by which it can get over the dam.

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2 So we've got this stuff below the dam in
3 concentrations that you couldn't get there by taking
4 it out of water and putting it in the sediment. So
5 it tell us there are other mechanisms by which it's
6 getting over the dam. And stirring up that bedload
7 discharging through the canals is one or a couple of
8 the mechanisms that are likely responsible.

9 Q So when the PCBs and a sheen as you've described it,
10 the ones that do not evaporate into the air drop
11 back down into the water, do they always drop right
12 back down instantly into the sediment?

13 A There's going to be a gradient. The water is
14 flowing. They don't drop instantly. So they're
15 going downstream somewhere where they began to
16 settle, they will settle back to the sediment, back
17 to the bottom.

18 Q Will they necessarily settle back into the sediment
19 or will some partition into a dissolved form?

20 A Well, some will partition in dissolve form, yes.
21 absolutely.

22 Q And those will move downstream?

23 A Those move downstream farther.

24 Q And is it possible then that those PCBs that have
25 partitioned into dissolve form as the sheen has

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2 moved back into the water, could be captured by a
3 sampling station?

4 A That's a possibility if the sampling station was
5 there when that happened.

6 Q Okay. And what about the bedload of sediment that
7 gets captured behind the dam and then has the
8 processes that you said that it comes over the dam?
9 Do all the PCBs that were in the sediment that
10 settled behind the dam necessarily stay absorbed to
11 the sediment as it goes through the process of
12 mixing over the dam and coming out the other side?

13 A No. Some will partition into the water. But it's
14 actually a very small amount that will partition
15 into the water.

16 Q How much will partition into the water?

17 A Typically we think of -- well, there are a couple of
18 factors, but we would think that the concentration
19 in the sediment ought to be about 1,000, 1,500 times
20 that in the water.

21 Q What's the basis for thinking that?

22 A The octanol-water partition coefficient, which is
23 the partition coefficient for PCBs between water and
24 oil runs on the order of ten to five, ten to 5.8
25 depending on which PCB group. So that would say

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2 100,000 times different if you had oil. And then
3 you got to translate that onto the organic matter in
4 the sediment that we're talking about. And if we
5 say one percent, than that moves it over to the
6 range of 1,500 times more expected to be on the
7 sediment particles than is in the water.

8 Q Okay. And I'm still not sure if I understand, so
9 please bear with me.

10 A It's not an easy concept if you never thought about
11 it.

12 Q Okay. My question was going to be, I'm still trying
13 to understand this amount of PCBs that gets
14 partitioned off of the sediment from the bedload as
15 it goes over the dam into the water. Is it possible
16 to attach an average percentage to that?

17 A No, I don't think -- there's not enough data
18 anywhere or theory that would allow you to do that.

19 Q So what allows you, and I'm just trying to
20 understand, to characterize it as a small amount?

21 A Because PCBs are lipophilic. They're oil loving
22 compounds. They are oil. They want to be with
23 their friends, other oil. Organic matter isn't oil,
24 but it's close to oil. Water is polar compound.
25 PCBs don't like to be in water, so they're going to

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2 attach themselves to other organic material, oil or
3 organic carbon in the sediment preferentially.

4 Q Okay. And if the parcel of sediment bedload that's
5 coming over the dam doesn't contain any oils, what
6 will happen to those PCBs as the bedload gets mixed
7 over the dam process?

8 A Well, once it gets on the other side, either if it
9 doesn't contain oil, it contains some of the
10 sediments that are suspended contain some organic
11 matter, those on the bottom that contain some
12 organic matter. So as you go forward down the
13 river, that process is going to try to come back to
14 equilibrium, so that the concentration in the water
15 is in equilibrium with this 1,500 times more in the
16 soil particle.

17 Q Okay. And as the bedload comes over the dam
18 containing sediments that have PCBs in them, in an
19 average Hudson River flow, not a high-flow
20 situation, but sort of the average flow of the
21 Hudson River, approximately how long will it take
22 for those sediments to resettle back into the water?

23 MR. BOYAJIAN: Objection to the form.

24 A Well, the answer to your question can be gotten from
25 Stokes Law which relates the density of the particle

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2 and the size of the particle, the viscosity of the
3 water, and it tells you how far that will settle in
4 what time length. And then you got to take the
5 velocity of your water moving down, and so it's
6 going to settle at an angle. So if it's grain size
7 of sand, it's going to settle pretty quick. If it's
8 clay, it might go half a mile downstream before it
9 settles.

10 Q Okay. And what about with sheens, once the sheen
11 starts disappearing back into water on an average
12 Hudson River flow, how long will it take for the
13 PCBs that were in that sheen to resettle?

14 MR. BOYAJIAN: Same objection.

15 A There's not really enough data to get hands around
16 that because there's just too many unknowns there.

17 Q And what are the unknowns?

18 A Well, how big the droplet is and exactly what its
19 density is, because different Aroclors have
20 different densities. And then the moving water
21 itself, how fast it's moving. So there's no good
22 way to -- I mean you can try to make an estimate,
23 but I wouldn't bet on it.

24 Q And is the movement of the sheens back into the
25 water and the PCBs in there to the extent that they

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2 don't evaporate or partition off into the water
3 column, they're settlement also subject to Stokes
4 Law?

5 A Yes.

6 Q So in your statements here in your rebuttal,
7 particularly on page 29, still in Section 5.7
8 talking about the transport of PCBs with the bedload
9 sediments.

10 A Yes.

11 Q The last sentence of that section says, "Highly
12 contaminated sediments below the dam contain PCBs at
13 concentrations that are greater than the
14 concentrations possible by partitioning from the
15 water column. And my first question is just a
16 clarifactory question, which is what dam are you
17 referring to here?

18 A Any of the dams where they got measurements.

19 Q Okay. Just the use of the singular threw me off.
20 So I just wanted to make sure --

21 A Right.

22 Q And what data are you relying upon for your opinion
23 that sediments below the dam/dams contain PCBs at
24 concentrations that are greater than the
25 concentrations possible by partitioning from the

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water column?

A Well, we know what the saturation concentration of PCBs in water is. And even if you saturated them the concentrations in sediments have been collected below the dams are higher than the equilibrium would allow.

Q Okay. Do you have any other basis for your opinion that the series of dams in the upper Hudson River will not prevent a PCB contaminated bedload of sediment from moving downstream?

A I think that's the evidence. I mean we've got data that shows it is downstream. So it got over the dam somehow.

Q And what evidence are you referring to?

A The samples that have been taken in the river.

Q The water column concentration samples?

A The sediment concentration samples.

Q The ones from the downstream deposition studies or are you referring to different sediment samples?

A There were other samples taken along the river, and I'd have to go back and look to see exactly which ones we were relying on, but there's certainly concentrations in the sediment which you couldn't get from the concentrations in the water.

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Q Okay. Outside of this litigation have you ever studied the movement of sediment containing PCBs across dams?

A Not PCBs. I've studied other things. Metals.

Q But not PCBs?

A Not PCBs.

Q I'd like to look back to your original report now that we've marked as Exhibit 1, and I'll turn your attention to page 38.

MR. BOYAJIAN: And just so you know, he's I think brought lunch back. So any time you what to -- whenever you're at the right point in time, you tell us. The lunch material is here.

MS. WADHWANI: Since we're starting a new section and it's 12:40, maybe this is a good time to take a lunch break.

MR. BOYAJIAN: That's why I mentioned it.

VIDEOGRAPHER: One moment please, off the record at 12:40 p.m.

(Whereupon, a lunch recess was taken and proceedings resumed at 1:40 p.m.)

(Brown Exhibit 5 was marked for identification.)

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2 VIDEOGRAPHER: On the record at 1:40 p.m.

3 BY MS. WADHWANI:

4 Q Dr. Brown, during the lunch break we discussed
5 marking as an exhibit one of the sets of documents
6 that you brought in, and I've gone ahead and marked
7 it as Brown Exhibit Number 5 to your deposition.
8 And generally speaking can you tell me what this set
9 of documents are that you have brought in that we've
10 now marked as 5?

11 A They're in several groups. The first group is a
12 group of documents that show the regulatory history
13 and response during the '60s up through '78.

14 Q Of GE?

15 A Of GE for the Fort Edward and Hudson Falls plant.
16 Then there's a segment of the Phase 1 evaluation
17 report on sediment traps. There's a segment, a part
18 of the Phase 1 evaluation report on sheens and
19 there's another one from the same report on
20 transects, and there's some statistical analysis
21 that I performed on the data and then there's a more
22 complete set of the documents that we've been able
23 to obtain from the Hanford site where research was
24 being done on the modeling and prediction of
25 groundwater movement, including not only models but

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2 there was at least one paper on two-phase movement.

3 Q Okay. Forgive my memory but I just want to ask you
4 again if the documents that you brought related to
5 the Hanford site, are those the ones that you said
6 that you didn't have when you prepared your opinions
7 in this case?

8 A I didn't have the time to sort them. So they're all
9 the documents that we now have from the Hanford site
10 from the research that was done there. They include
11 the ones that are cited in the report and others
12 that we didn't have at the time we wrote the report.

13 Q Okay. But the ones that you cited in the report
14 from when we look back at Exhibit 5 are the ones
15 that you relied upon; correct?

16 A Yes.

17 Q And insofar as you have documents in what we've now
18 marked as Exhibit 5 related to the Hanford site that
19 are not cited in your report, you did not rely on
20 those in coming to your opinion; correct?

21 A Right. Not when I wrote the report.

22 Q Okay. Thank you. Outside of the Hanford documents
23 are the remaining documents in Exhibit 5 documents
24 that you relied upon in coming to your opinions in
25 this case?

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2 A For clarification, coming to my opinions when my
3 report was written or...

4 Q Well, let's start with your original report.

5 A Okay.

6 Q Did you rely on any documents in that stack, not
7 including the Hanford documents for this purpose, in
8 coming to the opinions that you have set forth here
9 that you intend to offer in your original report?

10 A Yes. Those would have been the excerpts from the
11 Phase 1 evaluation report that I listed for you.

12 Q Any other documents in that stack in Exhibit 5 that
13 you relied upon in coming to your opinions as set
14 forth in your original report we've marked as
15 Exhibit 1?

16 A Not the original report.

17 Q Okay. So now you're moving onto my next question,
18 which is that, did you rely on any of those
19 documents in preparing your opinions for your
20 rebuttal report that we marked as Exhibit 2?

21 A Yes.

22 Q Which ones?

23 A In particular those that have a tab on it that says
24 Notice of Violation. And in the way of full
25 disclosure, there are a few of these that I did not

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2 see until after the report was prepared. This is
3 the second report that was prepared, the rebuttal
4 report.

5 Q Which documents have you seen after the rebuttal
6 report was prepared?

7 (There was a brief pause in the proceedings.)

8 A Okay. So I made them into two piles, those that I
9 remember that I did see and rely on when I was doing
10 my rebuttal report, and those that I believe I
11 didn't see until after I did my rebuttal report.

12 Q May I see the documents that you did not see or rely
13 upon to your rebuttal report? I'm going to just try
14 to do this as quickly and painlessly as possible.

15 A Sure.

16 Q But indicating to the record that the documents that
17 Dr. Brown did not see and rely upon for his rebuttal
18 report nor your original report; correct?

19 A That's correct.

20 MS. WADHWANI: Are as follows. I'm just
21 going to give the Bates stamps to extent that I
22 can if that's okay with.

23 MR. BOYAJIAN: Yeah. And if there's no
24 Bates stamp, any other reference that works.

25 MS. WADHWANI: Sure. A document with

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2 Bates stamp GEWS-09105946 through 47.

3 Document Bates stamped GEWS-09106269.

4 A document Bates stamped GEWS-09105644
5 through 5656.

6 A document Bates stamped GEWS-09105660
7 through 661.

8 GEWS-09105657 through 5658.

9 A document that is not Bates stamped with
10 a Bates stamp from this case, but that reads at
11 the top Declaration of John A. Harrington,
12 executed January 15, 2007. That appears to
13 have been marked at the deposition of Neil
14 Schiffrin in this case. It was marked as
15 Exhibit 14.

16 And a document Bates stamped GEWS-09105987
17 through 990. Thank you for allowing me to do
18 that.

19 THE WITNESS: No problem.

20 BY MS. WADHWANI:

21 Q And you can just hand everything back to the court
22 reporter and she'll take that as Exhibit 5.

23 A Fine.

24 Q One of the things I want to discuss with you right
25 now is a document you mentioned you had included in

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2 Exhibit 5 and mentioned earlier which was the
3 statistical analyses you and I believe you said the
4 graduate student who is working with you was helping
5 you on?

6 A Yes.

7 Q I'm going to mark these statistical analyses as
8 Exhibit 6.

9 (Brown Exhibit 6 was marked for
10 identification.)

11 BY MS. WADHWANI:

12 Q As an initial matter can you tell me generally
13 speaking what these are statistical analyses of?

14 A These are statistical analysis of the water samples
15 from the EPA database for 2005 through 2014 for
16 various stations. And some of the analysis are for
17 the full data set, both off and on season. And
18 since then I've also sorted out where we have only
19 off season points.

20 Q And have you noted on the documents here I guess the
21 last two pages are the off-season points --

22 A That's correct.

23 Q -- documents. And it appears, Dr. Brown, that there
24 are a couple of documents that don't span the 2005
25 to 2014 period, although please correct if me I'm

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2 wrong, it look like Lock 5 might go from 2009 to
3 2014?

4 A Right. We were short a data set there.

5 Q And Schuylerville goes from 2005 to 2007?

6 A That's right. Yes.

7 Q And the reason you only included data points for
8 those years is because of the information you had
9 available to you at the time?

10 A That's right.

11 Q All right. So will you briefly walk me through
12 these and tell me what it is that's being presented
13 on the Stillwater statistical analysis?

14 A That's an analysis of all of the data and what we
15 did was fit -- statistically fit a line. And that's
16 what the line is that goes through the data.

17 Q Okay. So the by data here, you're referring to
18 measurements?

19 A Right.

20 Q -- of raw water?

21 A Yes, in the river.

22 Q At the Stillwater monitoring station?

23 A Yes.

24 Q And these are 24-hour composite sample or grab
25 sample or combination of both?

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2 A That's correct.

3 Q Is it a combination of both, a composite sample and
4 manual sampling as far as you know?

5 A I think it is, yes, that's what I remember.

6 Q Okay. And what is the line that you said is on the
7 ascent here across?

8 A The line is the statistical fit line. So in a
9 standard statistical procedure you would determine
10 what line equation that line best fits the data. So
11 you could think of it as -- one way to think of it
12 is the moving average would be the line, but that's
13 a simplification of the process.

14 Q Well, simple is better for someone who has no
15 statistical background, which I'm ready to admit is
16 myself. So this line represents the average PCB
17 concentrations measured at Stillwater at these
18 different years; is that correct?

19 A It's a representation of it, yes.

20 Q Okay. And how did this information -- well, strike
21 that. We'll come back to that.

22 So tell me what statistical analysis you
23 performed here related to Lock 5 and what I'm
24 looking at?

25 A It's the same statistical analysis. That is we

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2 found what line would best fit the sets of data, the
3 data that's on there.

4 Q And why is the line for Lock 5 straight as opposed
5 to an ascending slope in Stillwater?

6 A Why is it flat as opposed to ascending?

7 Q Yes.

8 A They're both straight lined.

9 Q Thank you.

10 A You're welcome.

11 Q Flat. Thank you.

12 A Because the data really show no trend. That is flat
13 line means that the concentration is independent of
14 time.

15 Q What does that mean?

16 A The dredging did not decrease the concentrations in
17 the water for all the -- it didn't increase it, it
18 didn't decrease it. It's just a flat line. And I
19 draw your attention to the little box at the top and
20 let's go back to the first one so we can start
21 there. There's an R square which means how well
22 does this line fit the data.

23 Q So what is the .33 mean in terms of how well it
24 fits?

25 A It means it's not have very good fit. In just

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2 looking at the data you can see the data is
3 scattered pretty far around the line, particularly
4 when you get out into the later years. So it's not
5 a very good fit. So this slope is not significant,
6 and the slope is very small, .05. So what we can
7 conclude from this is that we can't conclude that
8 the concentrations increased statistically. All we
9 can conclude is they haven't changed.

10 Q Okay. So all you can conclude with regard to the
11 Stillwater statistical analysis is that the
12 concentrations from 2005 to 2014 have not changed?

13 A Right.

14 Q Okay. Thank you for that clarification.

15 A Yep.

16 Q And is that the same conclusion you reached with
17 Lock 5 even though the line is flat, is that the
18 concentrations of PCBs have not changed between 2009
19 and 2014?

20 A Right.

21 Q Okay. Moving onto Schuylerville. Please tell me
22 what the slope here represents.

23 A Well, here the line goes down instead of up. But
24 again the slope is very small, minus .0073, and the
25 R square is also very small .04. So what we

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2 conclude from this is there's been no change. The
3 line goes down but it's not statistically
4 significant decrease. And in fact nothing we've
5 looked at is significant different, so we conclude
6 again there's no change at Schuylerville.

7 Q So in other words, the PCB concentrations at
8 Schuylerville according to your analysis have
9 remained statistically speaking the same?

10 A Right.

11 Q Between, is it 2004 to 2011?

12 A Yes. There was some data back in 2004.

13 Q Okay.

14 A Through 2011.

15 Q All right. And then the next analysis is of the
16 information at the Waterford monitoring station?

17 A That's correct.

18 Q And I'm sorry, before the Waterford monitor stations
19 since you have information that precedes the sample
20 dredging project?

21 A Right. So we have all the way back into 2004.

22 Q And the 2004 information you have, that's also
23 information you obtained from the EPA?

24 A Correct.

25 Q So what that -- I'm sorry, tell me what's going on

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2 here.

3 A Same conclusion, it hasn't changed. So dredging
4 hasn't statistically increased it, hasn't
5 statistically decreased it, using all the data. And
6 I did these in response to Connolly who said it's
7 going down. I don't see -- statistically it's not
8 going down.

9 Q Where did Dr. Connolly say that the concentrations
10 of PCBs were doing down?

11 A In his report.

12 Q Was he referring to a specific location?

13 A I'd have to look to see, but I believe it was a
14 general statement.

15 Q Okay. We'll look at that in a little bit.

16 A Okay.

17 Q Okay. And then with your only off season points
18 here that you have for Lock 5, Stillwater and
19 Waterford, can you tell me each one what the results
20 were?

21 A Yes. For Lock 5, again, very poor correlation .005,
22 and the slope was very small. So even the off
23 season no change. It didn't go up, it didn't go
24 down. For Stillwater there's very little data out
25 at 2010 to 2014, but I ran it anyway. And there

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2 again the slope is down but it's not significant.

3 So statistically there's been no change in the off
4 season. And then if we go to Waterford we see the
5 same thing. There's been no statistical change. To
6 me statistics is really the only way to look at this
7 data.

8 Q Why is that?

9 A Well, you can't just look at it and say oh, it looks
10 like it's going up or it looks like it's going down.
11 To make a scientific statement you have to do
12 statistics to see whether your slope or your line is
13 significant or not. And so this -- and I haven't
14 seen where GE or the consultants have done any
15 statistics. So that's the standard way of
16 interpreting such data. So I did this just to
17 satisfy myself to find out what the real answer was.
18 And the real answer was dredging didn't make any
19 difference, didn't decrease it, didn't increase it.

20 Q Okay. When did you perform these statistical
21 analyses?

22 A Oh, it's about a month or six weeks ago.

23 Q So you performed these analyses not for purposes of
24 your original expert report; correct?

25 A Right.

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2 Q What was the purpose for which you performed these
3 statistical analyses then?

4 A Well, I got thinking about it more and in response
5 as I said, John Connolly's statements that it was
6 going down. I wanted see whether that was
7 statistically true or not.

8 Q Okay.

9 A Now, in full disclosure I did not go back to the
10 beginning of the record.

11 Q What do you by mean by the beginning of the record?

12 A If you go back into the early part of the century.

13 Q The 21st century?

14 A The 21st century and come forward there are -- if
15 you look at that data back there it was higher.

16 Q What was higher?

17 A The concentrations in the water were higher.

18 Q In the turn of the 21st century?

19 A Right.

20 Q Okay.

21 A Right. In 2001, 2002 and even before that in the
22 '90s it was higher.

23 Q Higher than what?

24 A Higher than what we're seeing now.

25 Q Higher than what we're seeing post dredging?

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2 A Higher than what we're seeing pre dredging and post
3 dredging.

4 Q So higher than what we're seeing from approximately
5 insofar as you have the information 2004, 2005
6 through 2014?

7 A Right. This ten year period approximately that
8 we're looking at.

9 Q Okay. So the concentrations were higher in 2000,
10 2001, 2002, 2003?

11 A Right. But that's shortly after the Allen Mills
12 spillway.

13 Q A-L-L-E-N, second word M-I-L-L.

14 A That release, and of course closer to the time when
15 the plant was operating and still releasing PCBs in
16 the '70s. So those were higher. But what I was
17 interested in and what Connolly was commenting on is
18 the impact of dredging. So I selected approximately
19 equal time for dredging, equal time during and after
20 dredging to do this analysis.

21 Q And you found statistically speaking there was no
22 difference in the concentrations?

23 A Right.

24 Q Now, please forgive me if this is an ignorant
25 question. I don't mind if you tell me it is an

1 KIRK WYE BROWN, Ph.D.

2 ignorant question, but are there different types of
3 statistical models that a statistician can run using
4 this information?

5 A Yes.

6 Q And so which model did you use?

7 A I chose the linear model using the value of the
8 data.

9 Q And by value of the data --

10 A I did not --

11 Q -- and you don't that mean in a valuative way;
12 right? Do you mean a value as in like N equals two
13 as a value?

14 A No. I'm saying I used the numerical values of the
15 data. I did not apply a change to that data. And
16 what I mean by that is one could also run this, for
17 instance, with the log of the data. That is
18 sometimes done, statisticians like to do that. It
19 confuses the heck off out people, including me.

20 Q And if would you confuse, you could imagine what it
21 would do to me.

22 A Let's keep it simple. Rather than talking about the
23 log of the data changing, let's see whether the data
24 changes.

25 Q Okay. So the ease of interpretation and

1 KIRK WYE BROWN, Ph.D.

2 presentation of the data was one of the reasons that
3 you chose to use what you've called the linear
4 model; is that correct?

5 A Yes.

6 Q Were there any other reasons that you chose to use
7 the linear model?

8 A Well, it fits the data. I mean one could've used a
9 curvilinear and asked is there a curve that fits
10 this data rather than a straight line. But you
11 don't get much out of that because there's nothing
12 you can do with a curve anyway.

13 Q Why not?

14 A Well, if you use a curve model and the next set of
15 data is very flat, you can't use the same model on
16 both sets of data. So I wanted to have the same
17 model, statistical model on both sets of data. And
18 as I said, this is the simplest way to look at it.

19 Q Were there any other reasons that you chose the
20 linear model?

21 A No, that's it.

22 Q How did this information beyond what you might've
23 already told me from the statistical analysis inform
24 your rebuttal opinions?

25 A Well, in that it rebuts Connolly's position that

1 KIRK WYE BROWN, Ph.D.

2 concentrations in the water columns are going down.

3 Q Okay. And you don't rely upon this information for
4 any other purpose in your rebuttal opinions?

5 A No.

6 Q In your opinion among these models that you have
7 identified for me as possible methods you could have
8 chosen in addition to the linear method for
9 addressing the data, is it your opinion that for
10 this type of data the linear method is the best
11 method?

12 A Yes.

13 Q Okay. Let's turn back to your report now. And I'm
14 going to first orient you to page 38 of your report
15 that we marked as Exhibit 1, but that's really only
16 by way of showing you that the section I want to
17 talk about now is the Section 4.8 that has been
18 labeled Standards.

19 A Yes.

20 Q But I'd like you actually now that you know where
21 we're at in report to turn to page 41 of your
22 report.

23 A Yes.

24 Q And I'm looking here at the last paragraph before
25 Section 4.9 labeled Fingerprint.

1 KIRK WYE BROWN, Ph.D.

2 A Right.

3 Q And I'm going to look at actually the last sentence
4 where you say that, "It is my opinion that the
5 higher mass loading at increased concentrations
6 allowed under the engineering performance standards
7 in Phase 2 pose an additional risk to the water
8 supplies of the plaintiff municipalities." That's
9 your opinion correct?

10 A Right.

11 Q And that's still your opinion today?

12 A Yes.

13 Q And what's the basis for this opinion?

14 A Well, the higher mass loads going down the river
15 than were originally projected means that those
16 materials are then in a location where they can more
17 easily be resuspended and pose a risk.

18 Q And by increased concentrations do you mean
19 increased PCB concentrations?

20 A Yes. And particularly we're talking about here is
21 during the dredging period.

22 Q I'm going to mark as Exhibit 7 the December 2010 EPA
23 Revised EPS for Phase 2.

24 (Brown Exhibit 7 was marked for
25 identification.)

1 KIRK WYE BROWN, Ph.D.

2 BY MS. WADHWANI:

3 Q Have you seen this document before?

4 A I have.

5 Q Did you read this document in preparation for
6 preparing your opinions in this case?

7 A Yes, I have.

8 Q Did you rely upon this document in forming the
9 opinions that you have in this case?

10 A Yes.

11 Q If you could please turn to page 2-1 of this Phase 2
12 EPS.

13 A Yes.

14 Q Section 2.1 right underneath that the EPA states,
15 "That the fundamental principles that have guided
16 the development of Phase 2 EPS are described below.
17 These principles have been developed to create a
18 flexible set or revisions to the Phase 1 EPS to
19 guide the Phase 2 remediation and to ensure that the
20 cleanup meets the human health and environmental
21 objectives of the ROD. And then they say the
22 principles include the following and they list four.
23 Including the principle that the standards have been
24 developed to protect human health and the
25 environment, while offering as much flexibility as

1 KIRK WYE BROWN, Ph.D.

2 practicable in the Phase 2 final design and
3 implementation." Do you have any reason to dispute
4 EPA statement that they designed the Phase 2
5 engineering performance standards to be protective
6 of human health?

7 A Well, you know it would be as much reflexivity as
8 practical. So they've given themselves some wiggle
9 room there. Obviously EPA wants to protect human
10 health and the environment, but obviously also they
11 want this dredging done. So they've given
12 themselves flexibility there.

13 Q Just so I'm clear on what you're saying. Do you
14 agree that the EPS has been designed by EPA with
15 standards to protect human health and the
16 environment?

17 A They're doing it to provide some level of protection
18 to human health and the environment.

19 Q Is it your understanding that Halfmoon has been
20 using as its water source the water from the City of
21 Troy since approximately late March 2010?

22 A That's my understanding, yes.

23 Q And are you also aware that EPA agreed throughout
24 the duration of Phase 2 to pay for Halfmoon's
25 incremental costs of using Troy water during all of

KIRK WYE BROWN, Ph.D.

Phase 2 dredging seasons and at least some Phase 2 dredging off seasons?

A Yes, that's consistent with my understanding.

Q And are you also aware that regardless of whether the EPA pays for the other Phase 2 off seasons, Halfmoon has decided they will not return to using Hudson River water during the dredging project?

A Yes.

Q So in other words, your aware that Halfmoon is not using Hudson River water during the entirety of Phase 2 on season and off season; correct?

A That's right.

Q If we look at footnote five on page 2-3 of the revised EPS we are marked as Exhibit 7 you see that EPA states, "That it is expected that no public water supplies in the upper Hudson portion of the site will use the river as their source of drinking water while Phase 2 is occurring." And that's your understanding as well; correct?

A Yes. Although that's kind of ambiguous because it says all Phase 2. Does that mean while Phase 2 is dredging or the whole period of time when Phase 2 is in operation.

Q I can't tell you what EPA means here. But it is

1 KIRK WYE BROWN, Ph.D.

2 your understanding at least that Halfmoon is not
3 going to use the river as its source of drinking
4 water during the on and off seasons of Phase 2?

5 A That's my understanding.

6 Q And EPA at least has an understanding that Halfmoon
7 along with other public water supplies will for at
8 least some portion of Phase 2, certainly at least
9 the, on seasons not be using the Hudson river?

10 A Right. But it is originally EPAs position that they
11 could use it during the off season.

12 Q Right. But my -- do you know what EPA's position is
13 now regarding Halfmoon use of river water during the
14 remaining dredging off seasons of Phase 2?

15 A I don't know that they made a statement of that
16 effect.

17 Q Do you know if the EPA has agreed to reimburse
18 Halfmoon for its incremental costs of using Troy
19 water during the remaining dredging off seasons?

20 A I'm not aware of such an agreement.

21 Q So going back to your opinion here. Given that
22 Halfmoon is on Troy water during a Phase 2, what is
23 the additional risk to the water supplies of the
24 plaintiff municipalities that you identify here?

25 A Well, it is an ongoing risk and that they don't have

1 KIRK WYE BROWN, Ph.D.

2 the option of going back into the river again.

3 Q Are the water supplies that Halfmoon is currently
4 using at any additional risk as a result of the
5 revised EPS standards by EPA for Phase 2?

6 A No, I don't think so.

7 Q Okay. Do you criticize the EPA for promulgating
8 these revised EPS standards for Phase 2?

9 MR. BOYAJIAN: Objection to the form.

10 A Tell me the page number again.

11 Q I actually am just asking about a general question,
12 Dr. Brown, for these Phase 2 revised EPS standards,
13 specifically -- more specific, the ones that you
14 identify in your report including the higher mass
15 loading and increased PCB concentrations allowed
16 under the engineering performance standards. Do you
17 criticize EPA for promulgating these standards?

18 A Well, they didn't meet the mass loading standards
19 during Phase 1. So EPA increased them. I would
20 have preferred that they would've tried to develop
21 methods to decrease the mass loading rather than
22 just change the standards to a higher level.

23 Q Okay. And going back to the increased
24 concentrations of PCBs allowed under the engineering
25 performance standards. What is your understanding

1 KIRK WYE BROWN, Ph.D.

2 of what that increase was? From what to what?

3 A I'd have to go back and look at it, but there was --
4 I can't picture the details anymore. It was
5 concerning how many times it had to be above 500
6 before a notification and then how many samples had
7 to be averaged to get there, and I can't pull those
8 details without looking at it again.

9 Q So is it your understanding that the resuspension
10 standard of 500-parts per trillion did or did not
11 change between the Phase 1 EPS and these revised
12 Phase 2 EPS?

13 MR. BOYAJIAN: Objection to the form.

14 A I'd have to look at it. I don't recall.

15 Q So sitting here today you don't know?

16 A I don't recall at this time.

17 Q Okay. And you can put out of your way the revised
18 EPS for Phase 2.

19 Now, as you state in your report and you
20 mentioned a few times today already, it's your
21 opinion that there are multiple sources of PCBs to
22 the water column of the Hudson River; correct?

23 A Yes.

24 Q And I'd like to look now at the opinions in your
25 report related to that view insofar as we haven't

1 KIRK WYE BROWN, Ph.D.

2 already looked at them. So first I'd like to turn
3 to Section 4.2 at page 22 of your original report.

4 4.2 --

5 MR. BOYAJIAN: Before you go any further,
6 I'm sorry, I don't mean to interrupt you, but
7 could I have the question before the last
8 question read back please.

9 (Whereupon, the following excerpt of the
10 proceedings was read by the Court Reporter.)

11 "Q Now, as you state in your report and you
12 mentioned a few times today already, it's your
13 opinion that there are multiple sources of PCBs to
14 the water column of the Hudson River; correct?"

15 BY MS. WADHWANI:

16 Q I'm going for look at Section 4.2 Mass Balance for
17 PCBs, but I'd like to turn your attention to page 22
18 of that report. And in the last paragraph of page
19 22 of your report do you state here that PCBs in
20 DNAPL and groundwater underneath the plant sites
21 serve as potential future sources of PCBs to the
22 river until all the DNAPL can be removed from the
23 fractured bedrock?

24 A Yes.

25 Q And is the fractured bedrock currently serving as a

1 KIRK WYE BROWN, Ph.D.

2 source of PCBs to the river?

3 MR. BOYAJIAN: Please note my negotiation
4 to the form of the question. And can I just
5 clarify something for the record, because I
6 wanted to set forth an objection that the
7 question that I asked to be read back, and I
8 just want it clear that your question means
9 when you say sources, different sources of PCBs
10 in different forms as opposed to different
11 sources? I mean it can be taken multiple ways.

12 MS. WADHWANI: So is insofar as you're
13 worried that I'm trying to suggest that
14 multiple sources means something other than GE?

15 MR. BOYAJIAN: Something other than GE.

16 MS. WADHWANI: I am not.

17 MR. BOYAJIAN: I appreciate you just
18 clarifying that for the record. That was the
19 source of my concern, and so we're clear on it.

20 MS. WADHWANI: Well we'll clean this up
21 with Dr. Brown.

22 BY MS. WADHWANI:

23 Q Dr. Brown, you haven't mentioned here today as we
24 started to get into and I'm going to discuss that
25 DNAPL from the plant sites is a source of PCBs to

1 KIRK WYE BROWN, Ph.D.

2 the river; correct?

3 A Yes.

4 Q And DNAPL from the General Electric plant sites;
5 correct?

6 A Yes.

7 Q And that DNAPL from in your opinion pools underneath
8 the Hudson River is a source of PCBs to the river;
9 correct?

10 A Yes.

11 Q And you have mentioned that you think that in the
12 future either erosion of the caps or migration of
13 PCBs through the caps will be a source of PCBs to
14 the water column of the river; correct?

15 A Correct.

16 Q So you understand here that I'm not asking you to
17 perhaps do the kind of work that you performed in
18 the other PCB case that you mentioned where you
19 allocated whose PCBs came from whom among a bunch of
20 different parties. I'm just talking about the
21 sources as you report them in your expert opinions.

22 A Yes, that's my understanding.

23 Q Okay.

24 MR. BOYAJIAN: Thanks.

25 MS. WADHWANI: Are you okay with that?

1 KIRK WYE BROWN, Ph.D.

2 MR. BOYAJIAN: I'm fine with that.

3 BY MS. WADHWANI:

4 Q Okay. So back to the pending question Dr. Brown,
5 which was that we're focused right now on Section
6 4.2 that you have titled Mass Balance for PCBs and
7 where you discuss DNAPL from the plant sites as a
8 potential future source of PCBs to the river;
9 correct?

10 A Yes.

11 Q Is this currently an actual source of PCBs to the
12 river?

13 A I'm well aware of efforts to capture that material
14 and remove it, and I applaud those efforts. But in
15 my opinion they're not 100 percent effective. So I
16 believe there are still some PCBs as DNAPLs that are
17 leaking into the river. May not be continuous, may
18 be episodic, but I believe the potential is there
19 certainly for things to continue to leak.

20 Q Well, I guess I want to be clear because you just
21 said the potential is there, and my question to you
22 is, is DNAPL from the plant sites through both as
23 you mentioned here groundwater underneath the plant
24 sites and DNAPL through the fractured bedrock
25 currently serving as an actual source of PCBs to the

1 KIRK WYE BROWN, Ph.D.

2 river?

3 A I believe they are. The difficulty is getting the
4 data to show that.

5 Q Why is that a difficulty?

6 A Well, there's no way to monitor every crack and
7 fissure that comes out from the bottom. There have
8 been observations in the past of the DNAPL dripping
9 out. The other factor here is that it's a dynamic
10 system. So depending on the height of the river,
11 the river may be pushing water back into those
12 cracks and the DNAPL into the cracks and then when
13 the water goes down a little bit seeps out. So it's
14 a dynamic system, but I believe that it is
15 continuing to leak.

16 Q Okay. Aren't measurements of sampling for PCBs in
17 the water column nearby and closely downstream of
18 the plant sites a good proxy for understanding what,
19 if any, contribution to PCBs in the water the plant
20 sites are contributing?

21 A They are certainly something to be considered for
22 that purpose.

23 Q Okay.

24 MS. WADHWANI: We need to change the disk.

25 VIDEOGRAPHER: One moment, please. At

1 KIRK WYE BROWN, Ph.D.

2 2:29 p.m. this is the end of disk two. Disk
3 three will follow.

4 (There was a brief pause in the proceedings.)

5 VIDEOGRAPHER: At 2:34 p.m. on April 16th,
6 2014 this is the disk three of the testimony of
7 Kirk -- Dr. Brown. Please proceed.

8 BY MS. WADHWANI:

9 Q Do you know where Bakers Falls is, Dr. Brown?

10 A Yes.

11 Q Approximately where is that?

12 A Well, Hudson River. I've seen it on a map. I'm
13 trying to place it in relation to the plant.

14 Q Let me see if I can help you out here. We're going
15 to mark as Exhibit 8 a map I've taken from the 2002
16 EPA Record of Decision. I have the full thing which
17 is called Figures, but the type is very poor. So I
18 will represent to you that the map that I'm taking
19 is from the figures but it's a much clearer copy.
20 Is everyone here okay with that yes?

21 MR. BOYAJIAN: We trust you.

22 THE WITNESS: Sounds great.

23 (Brown Exhibit 8 was marked for
24 identification.)
25

1 KIRK WYE BROWN, Ph.D.

2 BY MS. WADHWANI:

3 Q I know it's not noted on here, but looking at this
4 map do you have an understanding that Bakers Falls
5 is up near the upper GE plant near Hudson Falls?

6 A Yes, that's my understanding.

7 Q And do you see here where Rogers Island is?

8 A Yes.

9 Q And you see that that's south of the GE plants?

10 A Yes.

11 Q So my question to you first is, do you know what the
12 concentrations of PCBs have been at Bakers Falls
13 since 2009?

14 A I've looked at that data, but I don't have it in my
15 mind.

16 MS. WADHWANI: Sure. What I'm going to do
17 then to make it less cumbersome than going
18 through all of Dr. Connolly's report at this
19 time is I've taken a table from it for us to
20 look at to make it easier. Don I will
21 represent to you that the table I'm about to
22 mark was not one of the ones that Dr. Connolly
23 updated. He updated at his deposition figures
24 C1E, C1F and C1H and I'm about to mark as
25 Exhibit 9 figure 1-3a.

1 KIRK WYE BROWN, Ph.D.

2 MR. BOYAJIAN: And I don't know if the
3 witness was aware of that or not, but I'll
4 discuss that later.

5 MS. WADHWANI: And I can represent to you,
6 and you should certainly talk about with the
7 witness what you want later, but during this
8 deposition I'm not going to be marking any of
9 the charts that Dr. Connolly updated. So there
10 will be no confusion there. This is Exhibit 9.
11 (Brown Exhibit 9 was marked for
12 identification.)

13 BY MS. WADHWANI:

14 Q Do you see in this chart figure 1-3a from John
15 Connolly's report that the average yearly water
16 column PCBs at concentrations -- I'm sorry, let me
17 start again.

18 Do you see in John Connolly's report in
19 this chart that the average yearly water column PCB
20 water concentrates at Bakers Falls have been at or
21 less than 2-nanograms per liter since 2005?

22 A Yes.

23 Q Do you have any reason to disagree with this data?

24 A No.

25 Q And then I'm going to mark as Exhibit 10 figure 1-3c

1 KIRK WYE BROWN, Ph.D.

2 from the Connolly report.

3 (Brown Exhibit 10 was marked for
4 identification.)

5 BY MS. WADHWANI:

6 Q Do you see here, Dr. Brown, that this figure
7 represents average yearly water column total PCB
8 concentrations and major remediation activities at
9 Rogers Island?

10 A Yes.

11 Q And do you see in this chart that the average yearly
12 water column PCB concentrations at Rogers Island
13 have been at or less than 5-nanograms per liter
14 since 2005?

15 A Yes.

16 Q Do you have any reason to disagree with those data?

17 MR. BOYAJIAN: Objection to the form.

18 A No.

19 Q So in other words, is it true that based on these
20 charts the concentrations at Rogers Island have
21 since 2005 typically been at or less than
22 3-nanograms per liter higher than at Bakers Falls?
23 And actually, I will mark another chart that shows
24 that as well. Mark this as Exhibit 11. This is
25 figure 1-3d from Dr. Connolly's report.

1 KIRK WYE BROWN, Ph.D.

2 (Brown Exhibit 11 was marked for
3 identification.)

4 Q Okay. So you just answered my question, but with
5 the benefit of this chart laying it out clearly with
6 different colors, is it true that the concentrations
7 at Rogers Island have been typically at or less than
8 3-nanograms per liter higher than at Bakers Falls
9 since 2005?

10 A On the average that appears to be true. Yes.

11 MR. BOYAJIAN: And this chart with the
12 colors is Exhibit 11; right?

13 MS. WADHWANI: Yes. They all have colors.
14 But you mean the orange and blue. 1-3d is
15 Exhibit 11.

16 A The only here that you couldn't say that is for
17 2012, because the statistical brackets overlap each
18 other.

19 Q Okay. Thank you.

20 A Like the others do.

21 Q So would you agree that this data suggests that
22 since 2005 the contribution of PCBs to the river
23 from the plant sites has been at very low levels?

24 A I agree that it's decreased and I think that's
25 wonderful, but there's still PCBs coming from that

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source.

Q But what's coming now would you agree is at very low levels of PCBs?

A On the average it's a low level.

Q And according to these charts from Dr. Connolly's report that we marked as Exhibits 9 through 11, the concentrations between 2005 and 2000 -- well, to present, are on average lower than the concentrations in the water column in the 1990s and early 2000s when Halfmoon was obtaining their drinking water from the Hudson; correct?

A They are lower, yes.

Q And you don't have any basis to disagree with that data?

A No. But of course downstream from here they're higher than this.

Q They're higher than this downstream?

A Yes.

Q In what timeframe?

A In the same period we're talking about here, 2005 through 2013.

Q Okay. And what about in the periods prior to 2005, are the concentrations higher than what's represented here as the concentrations of PCBs at

KIRK WYE BROWN, Ph.D.

Bakers Falls and Rogers Island? And we'll give that a timeframe since it's a long span. We'll say between 1998 and 2005.

MR. TEDESCO: Objection to the form.

MR. BOYAJIAN: Form.

A I'd have to do an analysis of the data to answer that question.

Q Based on what's -- the data from the downstream?

A Yes.

Q Okay. So you're not able to answer that right now?

A Not without looking at the data. No.

Q But you would agree that the data presented here is reflecting concentrations of PCBs at Bakers Falls and Rogers Island?

A Yes.

Q It's not purporting to represent downstream data; correct?

A It's not downstream of dredging, no.

Q Could you please return back to page 22 of your report?

A Yes.

Q At the bottom in that same paragraph we were looking at previously you state that, "These DNAPL zones serve as potential future sources of PCBs to the

1 KIRK WYE BROWN, Ph.D.

2 river until all of the DNAPL can be removed from the
3 fractured bedrock." Is it your opinion that one
4 cannot state with reasonable certainty that they
5 will in fact be sources to PCBs to the river in the
6 future?

7 MR. BOYAJIAN: Objection to the form.

8 A No. It's my opinion that they will continue to be
9 and certainly the data shows there's still a source
10 of PCBs above where they dredged.

11 Q And how far into the future will these sources be
12 sources of PCBs into the river?

13 A There's no way to predict that.

14 Q Could you go into your rebuttal report, page 20
15 please. And I'm looking at the last paragraph which
16 says, "The DNAPL present in the fractured bedrock
17 below the Hudson Falls and Fort Edward facilities,
18 the potential for migration of the DNAPL toward the
19 river poses a threat to the Hudson River, especially
20 since there are voluminous fractures, both above and
21 below the water level in the river." Are you
22 able -- strike that.

23 Did I hear you correctly just a few
24 minutes ago when you said that it's your opinion
25 that there's not just a potential for migration but

1 KIRK WYE BROWN, Ph.D.

2 that DNAPL will actually migrate from the fractured
3 bedrock below the Hudson Falls and Fort Edward
4 facilities into the Hudson River?

5 A Yes, it's my opinion that some will continue to
6 migrate.

7 Q Can you state how long that will happen?

8 A No.

9 Q So you can't say whether it will be two more years
10 or 20 more years?

11 A No.

12 Q And it could be either?

13 A It could be. Yes.

14 Q Are you able to predict based on the data in
15 Exhibits 9 through 11 that we marked, the charts
16 from Dr. Connolly, whether the concentrations of
17 PCBs from the DNAPL at the plant sites will be
18 greater than the ones in the chart?

19 A No, I wouldn't risk such a prediction because I
20 believe, as I said earlier, ongoing releases are
21 likely be to be episodic.

22 Q Is it your understanding that these sources of PCBs
23 that we've just been discussing, the ground water
24 and the fractured bedrock, were sources that existed
25 before the dredging project?

1 KIRK WYE BROWN, Ph.D.

2 A Yes.

3 Q What's your understanding of how long these have
4 been sources of PCBs to the river?

5 A Well, the earliest records of investigations here
6 don't extend back to the beginning of the time that
7 PCBs were used there. But from what I understand
8 about operations of the plant and the releases that
9 they had likely within a few years after they
10 started using them there were PCBs certainly in the
11 soil and if not in the groundwater moving towards
12 the groundwater. So that would've been 1950
13 timeframe.

14 Q Is it your opinion that the PCBs in the groundwater
15 and the fractured bedrock were entering the Hudson
16 River in the 1950s timeframe?

17 MR. BOYAJIAN: Objection to the form.

18 Misstates the witness's prior testimony.

19 A Well, for instance, at the Fort Edward's plant there
20 was an outfall and PCBs were discharged down that
21 outfall forming a DNAPL plume at the end of that
22 outfall on the edge of the river. So there's one
23 example of where I believe soon after we started
24 having discharges from there there were DNAPLs that
25 were moving, that were releasing PCBs into the

1 KIRK WYE BROWN, Ph.D.

2 ground, the groundwater and the river.

3 Q And based on the documents you've seen with the
4 caveats that you've mentioned earlier about how far
5 records go back, what's the earliest you've seen of
6 PCBs entering the river from Fort Edward?

7 A I'd have to go back and look at when they started
8 operations there, but I believe it was shortly after
9 that.

10 Q So before 1990?

11 A Oh, yes.

12 Q And would you say that it was before 1990 that the
13 PCBs in the groundwater and the fractured bedrock
14 that's part of your opinion on page 22 starting
15 entering the Hudson River?

16 A I believe they would have, yes.

17 Q I want to turn back to page 22 of your report as
18 well. And again, that last paragraph, the last
19 sentence that spills over on to page 23 says,
20 "Likewise, the amount of PCBs remaining in the soils
21 and sediments at the Hudson Falls plant is as much
22 as four times the mass PCBs estimated to be already
23 in the river by EPA. These contaminated soils and
24 sediments will continue to recontaminate the Hudson
25 River after dredging is completed." Are you able to

1 KIRK WYE BROWN, Ph.D.

2 provide an estimate as to how long the soils and
3 sediments containing PCBs at the plant sites will
4 continue to contaminate the Hudson River after
5 dredging is completed?

6 A No, I don't think it's possible to give you an
7 estimate. And among other things I know that there
8 are remediation programs there, pumping groundwater
9 and things of that nature. And I certainly applaud
10 those activities, but those are never 100 percent
11 effective.

12 Q Why is that?

13 A Well, you put in wells for extraction but you don't
14 catch it all. Some get around the end of the wells.
15 The DNAPLs are particularly troublesome getting out.
16 They're at the bottom of the water column. It's
17 difficult to recover them. So they're to be there
18 for a long time. And we're looking at not a few
19 pounds or a hundred pounds, but tons of DNAPL that
20 are known to be there.

21 Q And where are you basing that estimate from?

22 A Well, if we look at the -- for instance, Hudson
23 Falls and the soil, subscript D.

24 Q Are you on Table One of your report on page 23?

25 A I am. The record of decision reported that many

1 KIRK WYE BROWN, Ph.D.

2 pounds of -- let's try again. The record of
3 decision estimated between 176,000 and
4 582,000 pounds of PCBs remaining in the soil at
5 Hudson Falls. So that's -- you know I took a middle
6 number there for the Hudson Falls soils. And you
7 compare that to what's to be removed from the Hudson
8 River, and there's less being removed from the
9 Hudson River than still remains in the soil at the
10 Hudson Falls plant.

11 Q Can you please turn to page 28 of your rebuttal.
12 And what I'm looking at here is the final paragraph
13 of Section 5.6 before it becomes Section 5.7. Could
14 you just read that paragraph to yourself and let me
15 know when you're ready to proceed.

16 (Witness complies with request.)

17 A Yes.

18 Q Okay. In the first sentence there you refer to
19 fundamental hydrologic principles. What are those
20 fundamental hydrologic principles to which you're
21 referring?

22 A Water flows downhill along a potential gradient. So
23 for instance, water infiltrates into the soil on a
24 bank next to the river, percolates down, joins the
25 groundwater which then flows to the river, and in

1 KIRK WYE BROWN, Ph.D.

2 the case of this river comes up into the river.

3 This is a receiving river.

4 Q Any other fundamental hydrologic principles you're
5 referring to there?

6 A Yes. The other one is that the sediments in the
7 river are finer grain materials. So they form some
8 barrier to the upflow of water. If you dredge them
9 and remove them that barrier is removed so that you
10 can have increased upflow there. And the concern is
11 if there's DNAPLs in those same cracks or dissolved
12 PCBs you'll have increased loading on the river than
13 you would've before you dredged it.

14 Q Okay. Any other fundamental hydrologic principles
15 you're referring to here?

16 A No, that's it.

17 Q A couple of sentences after this first sentence in
18 this paragraph we've been discussing you talk about
19 potential consequences of dredging. Do you know if
20 any of these potential consequences of dredging that
21 you have listed here in this paragraph have in fact
22 happened or are happening now?

23 MR. BOYAJIAN: Are you still referring to
24 the last paragraph 5.6?

25 MS. WADHWANI: Yes, I am.

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2 A My opinion is that when you remove the sediment or a
3 portion of sediment, that does increase the flow of
4 water into the river from groundwater. So I believe
5 it would be happening.

6 Q Okay. And as regards to the other potential
7 consequences do you believe those are happening or
8 have happened so far?

9 A Yes.

10 Q All of them?

11 A Yes.

12 Q And what data or information or are you relying on
13 for that opinion?

14 A It's back to first principles, that this is the way
15 the hydraulic system works.

16 Q So you're relying on the fundamental hydraulic
17 principles?

18 A Yes.

19 Q Anything else that you're relying on?

20 A No.

21 Q Okay. Back to your original report. Sorry for the
22 juggling, but we'll keep doing that today.

23 A That's all right.

24 MR. BOYAJIAN: I see that. That's okay.

25 I'm getting carpal tunnel syndrome.

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2 MS. WADHWANI: Trying to keep the topics
3 together.

4 MR. BOYAJIAN: Okay. You have a method.

5 BY MS. WADHWANI:

6 Q I'm sorry. Please turn to page 23 of your original
7 report.

8 A Got it.

9 Q Actually, I misspoke. I apologize to everyone. I
10 mean 23 of your rebuttal report. Now, you have an
11 opinion, correct, Dr. Brown, that DNAPL from pools
12 underneath the Hudson River is either or could be a
13 source of PCBs to the water column; is that correct?

14 A Yes.

15 Q And is your opinion that there are DNAPL pools
16 underneath the river that are currently contributing
17 PCBs to the water column or is it your opinion that
18 there are pools of DNAPL under the river that in the
19 future will contribute PCBs to the water column?

20 A I think both.

21 Q Okay. So now and in the future?

22 A Yes.

23 Q And what's the basis for that opinion?

24 A Well, my understanding of where the DNAPLs are and
25 how the groundwater flows.

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2 Q What's your understanding of where the DNAPLs are?

3 A Well, for instance, as we talked about before, the
4 outfall four with the DNAPLs right next to and in
5 the river and as water flows past them, even if the
6 DNAPL itself doesn't get to the river, the
7 contaminated groundwater will.

8 Q Okay. I'd like to look at the last paragraph on
9 page 23 of your rebuttal report, which is on the
10 Section 5.2 Presence of Pools of PCB DNAPLs, and you
11 state that, "The fact that no significant pools of
12 DNAPL have been found does not mean that a pool of
13 DNAPL is not present, only that a pool of
14 unspecified size or quantity has not been found to
15 this point in the dredging project." So is it your
16 opinion that there's a pool of DNAPL in the
17 sediments of the Hudson River?

18 A I believe there's still locations where there's
19 DNAPL in the sediments. Yes.

20 Q Is there a pool of DNAPL in the sediments?

21 A Yes, I believe they're still some remain. And the
22 evidence is particularly when they were coring
23 samples they would get -- sheens come up when they
24 were pushing sheet piles, the would get sheens to
25 come up. That indicates that there's some pool of

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DNAPL down there enough to release at least oils containing PCBs that then reach the surface of the sheen.

Q Do you have any opinion as to what the size of these pools of DNAPL in the sediments are?

A No.

Q And is it your opinion that there's a pool of DNAPL underneath the sediments of the Hudson River?

A I believe at some locations we'll find still -- if you probe them you would have sheens coming up indicative of pools of DNAPL.

Q What locations?

A I can't specify what locations.

Q Why not?

A Well, I haven't gone out there and probed them.

Q So what's the basis for believing that such locations exist?

A When people probed in the past they got sheens.

Q Okay.

MS. WADHWANI: We need to take a break for a moment.

VIDEOGRAPHER: One moment, please. Off the record at 3:03 p.m.

(There was a short recess in the proceedings.)

1 KIRK WYE BROWN, Ph.D.

2 VIDEOGRAPHER: On the record at 3:14 p.m.

3 BY MS. WADHWANI:

4 Q Dr. Brown, do you have an opinion as to when the
5 pools of DNAPLs in the sediments were formed?

6 A During the time PCBs were being released as free
7 phase to the river.

8 Q And when was that time?

9 A Well, certainly there are some records of it.
10 There's a memo from Dunham to Young complaining
11 about pyrrols being squeegeed down the drain.

12 Q And is that one of the documents from Exhibit 5 that
13 you told me earlier that you did not rely on as part
14 of your expert report?

15 A Yes.

16 Q So for purposes of your expert report at the time
17 that you wrote it, did you have an understanding of
18 when the pools of DNAPLs in the sediment were
19 formed?

20 A Well, I had an understanding certainly as early as
21 1963 when this is a memo from Harvey to Rossello,
22 R-O-S-S-E-L-L-O, Rossello, saying that there was a
23 visit from the Army Corps of Engineers and they saw
24 among other things, oils emanating from the end of
25 the discharge pipe into the river and that they were

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2 likely pyrroles. So there's 1963 where they in fact
3 indicated that free -- they knew free oils were
4 going into the river.

5 Q So you believe that the pools in the sediment or the
6 DNAPL in the sediment of the Hudson River were
7 formed at least as far back as 1963?

8 A Yes. And if we look at the other documents I think
9 it would indicate even back into the '50s.

10 Q Okay. And do you have the same opinion for when the
11 pools of DNAPL underneath the sediments of the
12 Hudson River were formed?

13 A I believe they would've been formed in the same
14 timeframe.

15 Q Do you have a sense, and here I'm talking about both
16 the sediments and the DNAPL underneath the sediments
17 of the Hudson River, just to try and shortcut
18 things, but if your answer is different from one or
19 the other you can certainly feel free to separate
20 them out. Do you have a sense of how big the pools
21 of DNAPL are in the sediments that are underneath
22 the sediments?

23 A Well, there are figures showing the extent of DNAPL
24 in the bedrock under the river, particularly in the
25 area where they put in the tunnel drains. So you

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2 can actually get a diagram, a figure, a map that
3 shows you that. So there's an extent of that one.
4 At outfall four there's a map that shows the extent
5 of DNAPL there.

6 Q In the sediments?

7 A Under the river. Both of these are under the river.

8 Q Okay.

9 A As far as mapping DNAPLs in the sediments, no, I
10 don't -- I don't -- as I told you before I don't
11 think anybody knows where they are, how big they
12 are.

13 Q And is that also your answer for the DNAPL
14 underneath the sediments, or no?

15 A Yes, that was for DNAPL under the sediments.

16 Q Okay. Do you know what Aroclors are in these pools
17 of DNAPLs that you say are in the sediments and
18 underneath the sediments in the Hudson River?

19 A I'd have to go back and see exactly. They did do
20 congener analysis. And so one can get a fingerprint
21 on which exact pyrrols were or Aroclors if you want
22 to think about it way, which Aroclors are in the
23 various deposits.

24 Q Do you consider these pools of DNAPL in the
25 sediments and underneath the sediments to be a risk

1 KIRK WYE BROWN, Ph.D.

2 to Halfmoon's water supplies?

3 MR. BOYAJIAN: Objection to the form.

4 A They would be a risk if they went back into the
5 river for water.

6 Q Okay. So fair enough. If Halfmoon used its water
7 treatment plant you would find the pools of DNAPLs
8 to be a risk to them?

9 A Yes.

10 Q And do you have that opinion concerning when
11 Halfmoon was using its water treatment plant to draw
12 Hudson River water? Were those pools a risk to
13 Halfmoon at that time?

14 A Yes.

15 Q Prior to being retained for purposes of this
16 litigation had you formed the opinion that there
17 were pools of PCBs underneath the Hudson River?

18 A No. I hadn't had an opportunity to think about it.

19 Q And I'm sorry if you told me this earlier, but I
20 just want to make clear for the record. That your
21 opinion that the presence of sheens is indicative of
22 a pool of PCBs or PCB or DNAPLs?

23 A Yes.

24 Q And it's your opinion that the sheens are indicative
25 of a pool of PCBs in the sediments or underneath the

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Hudson River or both?

A I would say both in the sediments which are under the Hudson River.

Q And what about underneath the sediments?

MR. BOYAJIAN: I'm sorry?

Q Underneath the sediments.

A At least where the, for instance, at outfall four and were underneath the sediments that were there, when you get down stream further I don't have any reason to believe that the pools would be under the sediments. I would think they would be entrapped in the sediments.

Q Okay. On page 34 of our original report I'd like to focus your attention on the last paragraph on that page, 34. You state here in the first sentence, "While high concentrations of PCBs were detected in the sheens during dredging, their presence alone is not indicative of the movement of free phase PCBs in the river." Correct?

A Yes.

Q So please clarify for me how this statement works with your opinion today that sheens are indicative of a pool of DNAPL in the sediments?

A Well, here we're talking about the movement. It

1 KIRK WYE BROWN, Ph.D.

2 doesn't say anything about the presence.

3 Q So explain to me then a little bit what you're
4 stating here in the first sentence of the last
5 paragraph on page 34.

6 A What I'm saying is that sheens are one method of
7 movement, but they're not the complete method by
8 which PCBs move down the river.

9 Q And they're a method of movement of PCBs like you say?

10 A Yes.

11 Q Okay. Is it your view that the presence of sheens
12 is indicative of pools of DNAPL in the sediment?

13 MR. BOYAJIAN: Objection. Asked and
14 answered.

15 A Yes.

16 Q Okay. Are sheens always indicative of PCB pools or
17 could they be indicative of something else?

18 A Sheens can be indicative of something else.

19 Q What else could be they indicative of?

20 A You could get a biological sheen. The composition
21 of organic matter with certain microbes forms a
22 sheen. However, it only happens in stagnant water.
23 And of course, you could get a sheen that didn't
24 contain PCBs, an oil sheen that did not contain.
25 Although I'm not aware of any sheens for which PCB

1 KIRK WYE BROWN, Ph.D.

2 has been measured in this case which did not contain
3 PCBs.

4 Q Okay. Are you aware of any -- just so I understand
5 what you just said. Are you aware of any sheen that
6 has appeared on the surface during dredging on
7 season or off season that has been found not to
8 contain PCBs?

9 A Not that I'm aware of.

10 Q That's what I was looking for clarification to.

11 A And I wouldn't expect any, in fact.

12 Q Why not?

13 A Because PCBs are so common in this river and they
14 like to dissolve in oils. So likely any oil that's
15 anywhere trapped in the river is going to have PCBs
16 in it.

17 Q So following up on that. Is that what you were
18 referring to here on the bottom of page 34, carrying
19 over to page 35 that there are petroleum oils in the
20 Hudson River that were released to the Hudson River
21 from a variety of industry and entities?

22 A Yes.

23 Q And that those petroleum oils contain PCBs within
24 them?

25 A Yes. Now.

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2 Q Now.

3 A Not when they -- some of them reached the river.
4 But now they do.

5 Q Fair enough. There were PCBs oils that went into
6 the river from I think you list here a variety of
7 different industries as part of their waste into the
8 river?

9 A Right.

10 MR. BOYAJIAN: Objection to the form.
11 Misstates. What the witness said, he said
12 right. But he said oils.

13 MS. WADHWANI: Oils.

14 MR. BOYAJIAN: But you said PCBs oils.

15 MS. WADHWANI: I didn't. I said petroleum
16 oils. We'll start again.

17 MR. BOYAJIAN: Did you say petroleum?
18 Listen, I have a hearing aid and I might have
19 heard you incorrectly. I could've sworn you
20 said PCB oils. I'll withdraw my objection if I
21 heard it wrong.

22 BY MS. WADHWANI:

23 Q We'll start again just to make sure that
24 Mr. Boyajian is not sitting here on an objection.
25 You note here at the bottom of page 34 the Hudson

1 KIRK WYE BROWN, Ph.D.

2 River has been contaminated with petroleum oils from
3 a variety of sources for over a century; correct?

4 A Yes.

5 Q And that these losses from this industry made their
6 way to the river through a variety of mechanisms;
7 correct?

8 A Right.

9 Q And that those petroleum oils from these variety of
10 sources now in your opinion have PCBs contained
11 within them; correct?

12 A That's correct.

13 Q What form were the PCBs or are the PCBs that went
14 into these petroleum oils? Were they in dissolved
15 form and absorbed onto the oils, were they in
16 sediment and the sediment holding the PCB absorbed
17 on it and became part of the oil? I'm just trying
18 to understand.

19 A Both of those can happen. And plus, at the GE
20 plants they were using mineral oil which is a
21 petroleum oil. And so some of these pyrrols were
22 deluded with mineral oil. And so when they were
23 discharged to the river immediately they were
24 combined with oil. And we see that in this 1963
25 Army Corps of Engineer investigation where they saw

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2 sheen at the outfall. Well, if it was simply pyrrol
3 you wouldn't get a sheen. So that's the evidence
4 that there were other petroleum oils also being
5 discharged from the GE facilities.

6 Q Okay. The PCBs that found their ways into these
7 petroleum oils, do you have an opinion as to what
8 form they were in when they, I don't know if the
9 correct word is attached or absorbed themselves to
10 the oil, so you let me know.

11 MR. BOYAJIAN: Objection to the form. You
12 can answer.

13 A Absorbed is the way to think about it or the other
14 word is to partitioned into them.

15 Q Okay.

16 A And they could've been in solution and then prefer
17 to be with their buddies in the oil or they could've
18 been in free-phase and a droplet of the free-phase
19 PCB came in contact with the oil and essentially
20 they mix and join together. One dissolves in the
21 other.

22 Q Okay. If a pool of DNAPL is not found in the
23 sediments or underneath the Hudson River
24 during dredging operations, will that change your
25 opinion about the presence of pools of PCBs?

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2 A In my opinion they've already been found by evidence
3 of these sheens that come up.

4 Q Okay. And how are you defining pool here? Is the
5 pool a droplet, is it an accumulation of droplets?
6 I'm just trying to understand what you mean by pool.

7 A It's enough to cause a sheen. And so all you need
8 is a couple of drops, and that's a pool, chemically
9 physically that's a pool of a free-phase liquid.
10 And so it could be very small.

11 Q So can one drop be a pool in your definition if that
12 drop causes a sheen?

13 A Yes.

14 Q Can you please turn to page 35 of your original
15 report, which is the next page. And again, we're
16 still on the opinions that you've offered in Section
17 4.6.

18 A Yes.

19 Q And I'm looking specifically here at the last four
20 lines in the last paragraph of page 35 where you
21 start with, "For the Waterford monitoring station
22 seven samples have been reported during 2010-2011."
23 Do you see that?

24 A Yes.

25 Q And you see the rest of the information that

1 KIRK WYE BROWN, Ph.D.

2 follows?

3 A Yes.

4 Q Did the seven Waterford samples in excess of
5 225-parts per trillion in 2010 and 2011 that you
6 note here contain Aroclor 1254?

7 A I don't know whether it was analyzed so you could
8 split it out. I haven't looked at that. So I'd
9 have to look at the data to see whether it's there.

10 Q Did you know when you wrote your report whether
11 these seven samples at Waterford contained Aroclor
12 1254?

13 A I didn't make that distinction. I was looking
14 simply at bulk PCBs. We could go back and look at
15 that though.

16 Q Okay. And is that your same answer for these two
17 samples collected during the high-flow events in
18 March 2010 and May 2011 at Waterford that exceeded
19 1600-parts per trillion, did you make an assessment
20 at the time as to whether those contained Aroclor
21 1248?

22 A No, I did not.

23 Q Now, you've told me earlier today, correct, that you
24 believe Halfmoon needed an alternative water supply
25 during the dredging and the dredging off seasons;

1 KIRK WYE BROWN, Ph.D.

2 correct?

3 A Yes.

4 Q And one of the things that I'm hoping you can
5 clarify for me from your original report, Dr. Brown,
6 is whether you believe there will be some point in
7 time at which Halfmoon can return to using the
8 Hudson River as its water source or whether you
9 think that Halfmoon should permanently be on an
10 alternative water source?

11 A It's my opinion that despite the best efforts to
12 clean up this river the PCBs will persist for a very
13 long time. And I believe we should all be focused
14 on towards getting the concentrations down to the
15 MCL Goal, which is zero. And I think it's going to
16 take many decades, if not a century, to flush
17 everything out of the river to a point where we can
18 begin to approach that. So I think eventually
19 they'll be able to go back in the river, but it's
20 going to be a very long time.

21 Q Is it your view that Halfmoon should not go back on
22 the river until the concentrations of PCBs in the
23 Hudson River are at the MCLG of zero?

24 A Yes.

25 Q And what's your basis for opining that that will

1 KIRK WYE BROWN, Ph.D.

2 take decades or upwards of a century?

3 A Well, GE stops using PCBs in their plants in 1977.
4 We're now quite a few number of years past that, 40
5 years almost, and we still see significant
6 concentrations in the river. The cleanup process
7 will and obviously has in some cases begun to
8 diminish that. These residues last a long time, the
9 PCBs don't degrade, and so they're just going to be
10 persistent for a very long time in the river and in
11 the water next to the river. If you think about it
12 they're now PCBs in the aquifer by Stillwater.
13 Those will have to be flushed out into the river.
14 So they're additional sources have occurred. They
15 were sinks. Now as the river cleans up they're
16 going to become sources to the river. So it will
17 take a long time for nature to flush all that out
18 after man is done doing what we can.

19 Q Are the PCBs in the Stillwater aquifer, is it
20 necessary for those in your opinion to all be
21 flushed out and to return to a level of zero before
22 Halfmoon can return to using the Hudson River?

23 A I think what you want to do is get the river water
24 down to zero. I don't think it will be possible to
25 ever get them all out of the aquifers in some of

1 KIRK WYE BROWN, Ph.D.

2 these little cracks. But if we get it to the point
3 where their release rate is so low, that when one
4 does an analysis you'll be at zero.

5 Q What do you consider a low release rate?

6 A A release rate that doesn't cause the river to be
7 over zero by the analysis.

8 Q Well, is it your opinion that if you release into
9 the river say 5-nanograms per liter of PCBs, that
10 the river won't be at zero or will be at zero?

11 MR. BOYAJIAN: Objection to the form.

12 A If that 5-nanograms is diluted enough so that we get
13 to the point where we're at the detection limit, the
14 detection limit is less than a part per trillion,
15 which kind of is the zero level, then small releases
16 will be diluted that you won't see it anymore. You
17 will still have some potential, but it really
18 decreases it.

19 Q Okay. If you can turn to page 43 of your report,
20 please. And I'm looking here at Section 4.10,
21 Long-Term. And your statement here is that, "It is
22 my opinion that even with the ongoing remediation
23 the time required to return the PCB concentrations
24 in the river to levels before the start of dredging
25 could take decades, if not longer." And then in the

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2 first paragraph concerning the basis for that
3 opinion you say, "It is unrealistic to project the
4 future concentrations of PCBs in the water column of
5 the river or the future concentrations of PCBs in
6 the water supply sources connected to the river with
7 any certainty." Correct?

8 A Yes.

9 Q And you stand by that opinion sitting here today?

10 A Yes.

11 Q Okay. If it's unrealistic to project the future
12 concentrations of PCBs in the water column of the
13 river, then how is it that you can state that it
14 will take decades for the river to return to pre
15 dredge levels?

16 A Because of my understanding of the mechanisms of
17 what's going on there, they are sequestered. And
18 certainly the caps sequestered some, which will
19 continue to diffuse into a river. I talked to you
20 about the Stillwater aquifer and there well may be
21 others in that regard, and those are going to
22 continue to bleed. It's just unrealistic to predict
23 how long this is going to take. Although, certainly
24 the processes of diffusion and mass transfer in an
25 aquifer are known and they're rather slow. Once the

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2 PCBs are in the sediment in the aquifer or in the
3 aquifer, they prefer to stay there. So they only
4 very slowly partition to the water. And so we
5 looked at this at many Superfund sites, and it takes
6 a very long time to clean up the groundwater.

7 Q Okay. Is it your opinion that it will definitely
8 take decades before the PCB concentrations in the
9 river return to the levels they were before the
10 start of dredging?

11 A Yes.

12 Q And what do you base that on?

13 A The same things I just said.

14 Q Okay. Are you relying on any PCB data from the
15 Hudson River in support of that opinion?

16 A Well, in a way. I mean we certainly that know that
17 post dredging there are areas that are capped that
18 have 10, 20-milligrams per kilogram remaining. We
19 know as I said at Stillwater there's PCBs in that
20 aquifer. And so there's some data points that say
21 that we're leaving significant amounts in the river
22 which will continue to then bleed out into the
23 river.

24 Q And can you say that some of these data points will
25 bleed out into the river over time in concentrations

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2 that will not make the goal of zero possible?

3 A I believe eventually you will get down to the point
4 whereas if the remediation is successful and carried
5 through, whether -- we'll be approaching zero on
6 bulk samples.

7 Q The remediation meaning the dredging?

8 A The dredging and the other things they're doing
9 upstream, the continued pump and treat and use of
10 the tunnels that they drilled under the river.

11 Q Are you referring to the tunnel draining collection
12 system at Hudson Falls?

13 A Yes, Right.

14 Q When you say decades, that could be between two and
15 nine. Do you have an estimate of how many decades
16 it will take for the levels to return to their pre
17 dredging concentrations that you referred to in
18 opinion 4.10?

19 A I'd say will beyond my lifetime. And I lean towards
20 the nine.

21 Q So you think it will be upwards of nine decades?
22 And do you have a basis for that opinion that is in
23 addition to the bases that you told me earlier for
24 your opinion that it will just take decades?

25 A No. I've already told you my basis.

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2 Q Okay. And so you do believe that there's a way to
3 broadly predict the future concentrations of PCBs in
4 the Hudson River such that you would say that it
5 could take upwards of nine decades to return to the
6 pre dredging levels?

7 A I wouldn't use the word broadly. I would say
8 predict. And I would admit somewhat crudely, but
9 based on what I know about other cleanups, people
10 have pumped and treated for 30 years and turned it
11 off and went back in five years and the
12 concentrations were higher then when they started.
13 So I mean once these things get into the natural
14 deposits, it's very difficult to get them all out.

15 Q And your experience over the last 30 years have you
16 seen what happens with concentrations of a
17 contaminant that had been dredged?

18 A No, I haven't followed dredging.

19 Q Okay. And so are you able to predict future
20 concentrations in the river post dredging?

21 A Only those that I have already given you. That is
22 that I believe it will continue to be present for a
23 very long time.

24 Q But that's not based on your experience with other
25 dredging sites; correct?

1 KIRK WYE BROWN, Ph.D.

2 A True.

3 Q In concluding that level of PCB should be zero
4 before it would be safe for Halfmoon to return to
5 using the Hudson River as their water supply, did
6 you conduct any sort of risk assessment?

7 A No. I described to you earlier the basis for that.

8 Q Okay. Have you ever published any articles in any
9 peer reviewed scientific literature on health
10 effects of PCBs in animals?

11 A I have not.

12 Q Have you published any articles in peer reviewed
13 scientific literature on the health effects of PCBs
14 in humans?

15 A I have not.

16 Q Have you conducted any studies towards that end on
17 either animals or humans?

18 A No.

19 Q I wanted to ask you something about your opinion on
20 page 44. I'm trying to find where specifically, so
21 please bear with me for a moment. I'm not able to
22 easily identify, but I wrote out the sentence I want
23 to talk to you about and you can tell me if it
24 sounds like something that you concluded in your
25 report or not.

1 KIRK WYE BROWN, Ph.D.

2 MR. BOYAJIAN: I'll look for it. You go
3 ahead and ask the questions.

4 BY MS. WADHWANI:

5 Q Thank you. So the sentence I have here is, "That
6 such monitoring with the present technology will
7 likely not provide representative concentrations in
8 the river, nor will it identify spikes in the PCB
9 concentrations within the river flow." And I
10 believe the monitoring you're talking about here is
11 the composite.

12 A The composite.

13 Q The composite. And what do you mean by with the
14 present technology, that's my question?

15 A Well, technology is developing rather rapidly and
16 eventually there may be a technology whereby one
17 could use, who knows, lasers or something else to
18 measure PCB in the water column. So what I'm saying
19 is the technology isn't here now. It may come in
20 the future.

21 Q And how do you know that the current technology will
22 not provide representative concentrations or
23 identify spikes in PCB concentrations?

24 A Well, because the current technology as we discussed
25 before, the compositing decrease doesn't result in

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2 the highest concentrations, the ones that we're
3 really concerned about because you're mixing it with
4 less contaminated water. And if you take individual
5 grab samples from the surface or from some depth,
6 you're not sure that that's representative of the
7 cross section of the river that's flowing down. So
8 it's just a very difficult thing to sample, a river,
9 because of again the heterogeneity of the system.

10 Q Do you have an opinion as to whether there are
11 technologies for filtration that would make drinking
12 water that was provided to communities, treated
13 drinking water, towards the levels of PCBs that you
14 would like to see in water provided to customers as
15 opposed to what's in the river water?

16 MR. TEDESCO: Objection to form.

17 A Filtration is a common water treatment and it will
18 remove some of the PCBs. But there's no guarantee
19 that it removes all.

20 Q Okay. Do you know how effective a granular
21 activated carbon system is at removing PCBs?

22 A They have been used for PCBs. They do provide some
23 effectiveness. But there's always -- you have to do
24 analysis, make sure you don't exceed the capacity.
25 There's always possibility of channeling and water

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2 getting through around the filter. So while they
3 help, they're not foolproof.

4 Q Have you looked at, and I'm not saying there's any
5 reason why you would have, but have you looked at
6 the data concerning the drinking water that was
7 treated at the Village of Stillwater using the GAC
8 filtration system, have you looked at the
9 concentration of PCBs in the treated water?

10 A I looked at that a long time ago, I don't recall
11 what they were. But I do know that one of the
12 problems was the backflush water exceeded the state
13 standard for discharge.

14 Q You mean to the Hudson River?

15 A Into the Hudson River, yeah.

16 Q And municipality doesn't have to discharge its
17 backwash into the Hudson River; correct?

18 A No. But it has to do something with it and that
19 costs money.

20 Q Fair enough. Do you know how much money it costs to
21 provide -- well, strike that.

22 What alternatives would a community have
23 for dealing with its backwash discharge?

24 MR. BOYAJIAN: Objection to the form.

25 A The most likely one would be granular activated

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2 carbon.

3 Q But you mentioned that in your view then there are
4 issues with discharging their backwash?

5 A Right.

6 Q From a granulator activated carbon system that is
7 being used to treat PCBs back into a water body of
8 New York State such as the Hudson River?

9 A Right.

10 Q And my question is, what are some of the other
11 options for a dealing with a backwash?

12 A Ah, you would have to containerize it and ship it
13 off somewhere for treatment and disposal.

14 Q Okay. Can you please turn to page 29 of your
15 rebuttal report. And I'm looking here at 5.8,
16 Declining Water Column Concentrations Following
17 Dredging, and this was something we were speaking
18 about earlier, Dr. Connolly's opinions concerning
19 the declining of PCBs levels in the river in
20 response to the dredging program. Do you see that?

21 A Yes.

22 Q And do you see here that as you've noted
23 Dr. Connolly was citing water column data for the
24 Thompson Island pool and the trend in that data from
25 on a before dredging and after dredging?

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2 A Yes.

3 Q And the conclusions from Dr. Connolly that you cite
4 here indicate that there is a decreasing trend in
5 PCB concentrations at Thompson Island pool after
6 dredging moved downstream from there; correct?

7 A Yes.

8 Q You also note that you do not question the validity
9 of this data; correct?

10 A Right.

11 Q And based on this data would you agree with me that
12 the reason we don't yet see the same results at Lock
13 5, Stillwater and Waterford is because dredging
14 hasn't taken place in those locations yet?

15 A I believe that's a major factor.

16 Q And based on the experience at Thompson Island can
17 we expect to see similar results at Lock 5,
18 Stillwater and Waterford?

19 A I would hope so.

20 Q Do you have any reason to think that those results
21 won't be experienced based on the experience at
22 Thompson Island?

23 A I would hope that the dredging would not release so
24 much to areas that aren't being dredged as they move
25 down river. That that would be true, that it would

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2 begin to decrease as they move down river. But the
3 data I've seen so far doesn't indicate that.

4 Q And what about this Thompson Island data that
5 Dr. Connolly has presented?

6 A That's shown decreases. Yes.

7 Q Are you aware of the health risks of lead in the
8 drinking water?

9 A Yes.

10 Q What are they?

11 A The health risks of lead are particularly for
12 children under the age of five, there's a direct
13 relationship between blood lead level and impaired
14 cognitive ability.

15 Q In fact I think you were speaking about that earlier
16 this morning, correct, in connection with a case
17 that you'd recently worked on or were still working
18 on?

19 A Yes.

20 Q Okay. Do you know what the MCLG is for lead?

21 A I have to look at the table. I haven't looked it
22 for a while.

23 Q Okay. Sure. Let me see if I can help us out here.
24 I'm marking as Exhibit 12 the annual drinking water
25 quality report for 2008 for the Town of Halfmoon.

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2 (Brown Exhibit 12 was marked for
3 identification.)

4 BY MS. WADHWANI:

5 Q Have you seen this document before, Dr. Brown?

6 A I have not, but I'm familiar with it.

7 Q And please take the time if you'd like to
8 familiarize yourself with it. When you're ready
9 what I want to point you to specifically is page
10 five. But you let me know when you're ready.

11 A I'm ready.

12 Q Do you see here in this chart entitled Town of
13 Halfmoon Consolidated Water District Table Detected
14 Contaminants, under the row listed inorganic, ten
15 contaminants there's a listing for lead?

16 A Yes.

17 Q And do you see that the MCLG there is zero?

18 A Yes.

19 Q And I'll represent to you that in 2008 the Town of
20 Halfmoon Consolidated Water District Table customers
21 were taking this water. Will you accept that
22 representation?

23 A Fine.

24 Q And what was the level of lead detected?

25 A It ranged from non-detect to three, and that would

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2 be -- let's see, the units would be part per billion
3 or micrograms per liter and the average was two.

4 Q Okay. And based on the fact that the MCLG here is
5 zero. Would it be your opinion that the water in
6 the consolidated water district for the Town of
7 Halfmoon would be unsafe to drink?

8 A No.

9 Q Why not?

10 A Lead is not a known carcinogen. It has other health
11 problems, but it's not a carcinogen.

12 Q Okay. So is it your opinion that water that has
13 chemicals and contaminants that have MCLGs of zero
14 are nevertheless still safe to drink if there is
15 some level and if the contaminant present as long as
16 that contaminant of chemical is not a known
17 carcinogen?

18 A That's one factor. The other consideration here is
19 that adverse impacts of lead are on infants and
20 people with children under the age of five.

21 Q And do you consider those vulnerable populations?

22 A They are vulnerable population, and one can provide
23 other water sources if need be. The MCL for lead is
24 much higher than that, than the zero. But again,
25 there's no data that show impairment under two.

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Q Okay. And if you could turn please to page six of this document. And you see here a chart called Waterford Waterworks Table?

A Yep.

Q And at this point in time is it your understanding that Halfmoon was obtaining at least some of its water for its customers from the Town of Waterford?

A Yes.

Q And do you see here again the entry for lead under inorganic?

A Yes, I do.

Q And again, the MCLG is zero. And what is the reading of the level detected here?

A The reading of nine is the 90th percentile of 20 tests. The action level for lead was exceeded in two of the 20 tests.

Q Would you consider this water unsafe to drink given its detection level versus the MCLG of zero?

A I wouldn't hesitate to drink it because I know that adults are much less likely to be impacted. I would say there might be a warning for children.

Q Okay. Can you -- scratch that.

Is it your understanding that the water provided by the Waterford WaterWorks to the Town of

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Halfmoon in 2008 was drawn from the Hudson River?

A That's my understanding, yes.

Q Okay. And can you predict with any level of certainty how much lead would be in Halfmoon's drinking water if they went back to the Hudson River after dredging operations were completed?

MR. TEDESCO: Objection to the form.

A No.

Q Why not?

A Well, there are other sources of lead than the original water. Lead is a common metal. So there could be sources in the piping and other things. So this may not be a result -- may or may not be a result of the water source.

Q Okay. Would you be able to determine that with any research or sampling?

A Yes. Upstream/downstream sampling would determine that.

Q Okay. Based on what you're seeing here would you tell Halfmoon not to resume taking Hudson River water in the future because you can't tell them with certainty how much lead will be in the water?

A I would say you'd want to make a determination of that before you made a decision.

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2 Q And how would you go about making a determination
3 about that?

4 A Sampling.

5 Q If you could please turn to page 14 of your
6 rebuttal. I'm looking here specifically at this
7 Section 4.0, response to the opinions of Neil
8 Shifrin. The first paragraph, last sentence says,
9 "While I do not doubt the validity of the actions on
10 the part of GE as described by Dr. Shifrin, I do
11 have reasonable doubt considering the motivations
12 behind these actions and the timing of the results."
13 Can you please explain to me what you mean here?

14 A Well, perhaps the best example is in 1966 they had
15 an inspection by the health department.

16 Q GE?

17 A GE had an inspection and were told that they had to
18 do certain things, upgrades, and stop releasing
19 untreated water to the Hudson River. And they had a
20 period of time to respond. The record then
21 indicates that they didn't do anything. And --
22 well, no. The record first indicates that they then
23 asked for an extension of six months. They got an
24 extension, but then more time went by, about a year
25 and a half, and then they began thinking about it

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2 again. And there's a memo from Dr. Anderson, their
3 environmental consultant, who says well, you know
4 their investigation was really superficial. They
5 don't know what we're dumping into the river.
6 They're focused on the tin. They don't know how
7 many outfalls we have or where they are, but maybe
8 we ought to think about taking some samples. This
9 is about I think two years after the initial visit.
10 So they got around, and then he said let us talk to
11 them. We knew the health department people
12 personally. And then they got around to some
13 sampling in November. And finally in February the
14 results were present and Dr. Anderson looked at them
15 and said well, everything looks reasonable except
16 for a few things in particular the BOD and the COD.
17 They're going to be red flags for the regulatory
18 agency. And I believe he knew that that was,
19 particularly the COD, was the result of oils in the
20 water being discharged to the Hudson. So he said
21 let's withhold that data. Remove it from the
22 tables.

23 Q So what's the --

24 MR. BOYAJIAN: Wait. Were you done with
25 your answer?

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2 A No.

3 Q Sorry.

4 A So then sometime later there's an internal memo, and
5 I can get all of these dates and exact who wrote
6 who, so I'm doing this from memory. So we'll go
7 back on it if we need to pull the individual
8 documents. But then internal memo saying well, we
9 deliberately withheld this data. And it's a
10 layman's understanding, and I think this was Harvey
11 who's writing this, this is a layman's understanding
12 that the elevated BOD/COD would have been from oils
13 that were discharging to the river, and pyrrols and
14 oil. So they knew that it was oil that was going to
15 the river and they had a good idea it was pyrrol.
16 Because way back in '63 they said right in their
17 document we suspect it's pyrrol going -- and PCBs
18 going into the river.

19 So then that was about '70. A task force
20 is formed. The task force makes recommendations.
21 Although they're not implemented. And then another
22 internal memo, which is about two years later, about
23 '72 a manager went into the plant and saw where PCBs
24 were being squeegeed down the drain and also looked
25 around and said that the conditions in the plant

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were terrible and that it was a result of mismanagement, or he didn't use the word negligence, but he came close to it. So here we are '66 they were told to clean up their act, '72 their still thinking about it and they haven't got it yet. But he says we're going to start replumbing our drains so they don't go to the river. So this is five years after they were notified first. We're going to start building pans to go under our equipment to catch the leakage. It hadn't happened yet. This goes on until finally in -- '77 -- or '75 they were ordered to do things. And in fact they were required give a list, I don't have exact date on the list, a list of what it is they had done. And it took an abominably long time. In fact, it took ten years for them to get around to do anything they were asked to do back in 1966, which would have diminished, if not, eliminated their ongoing discharges to the river of at least 30 pounds a day and maybe more of PCBs. In fact I would be quite sure it was more. Then finally they're beginning to implement these things. They were told you have a build a waste water treatment plant. You have to design it in a month and you have to build it in

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2 five months. And apparently they did that after ten
3 years of dragging their feet.

4 '77 comes along and they completely stop
5 using PCBs. They went DOP, Dioctyl phthalate,
6 P-H-T-H-A-L-A-T-E, as a substitute for the oil in
7 their transformers. That was '77. Sometime later
8 there's a memo in the file that reports that in fact
9 despite all their knowledge now that they shouldn't
10 be dumping this stuff in the river, the
11 concentrations of dioctyl phthalate that they've
12 been dumping in the river exceed the 5-milligrams
13 per liter standard that they had. So for some
14 reason they never got around to doing what needed to
15 be done. And when they finally did get around to
16 doing what needed to be done, they weren't paying
17 enough attention to get it done right so that they
18 weren't continuing to pollute the Hudson River with
19 this new chemical that they were using. So that's
20 why I say that his statements that GE was responsive
21 to environmental concerns is not true.

22 Q And what do you mean when you say you have
23 reasonable doubt concerning the motivations behind
24 these actions?

25 A Well, it was coverup actions. You don't lie to the

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2 state by withholding data from them, and then you
3 know talk about it in further memos and still
4 nothing is done about that. You've got to -- they
5 were being told don't dump stuff in the river, don't
6 dump your waste into the river. And they just
7 ignored that for ten years.

8 Q And the narrative that you just presented to me, is
9 that based on your reading of the documents?

10 A Yes.

11 Q Okay. And were those documents GE documents that
12 were provided to you by Mr. Boyajian?

13 A Yes.

14 Q And were most of these documents sort of internal GE
15 documents or were most of them external documents to
16 GE?

17 A Internal.

18 MR. BOYAJIAN: Objection to the form.

19 Q Okay. The 1966, the requests or notification from
20 the DOH that you mentioned earlier to stop sending
21 untreated water to the Hudson River. Did DOH say
22 that they were concerned about PCBs?

23 A They did not. And you raise a good point. The
24 analytical techniques were not really there. So it
25 would have been difficult for DOH to even pick up a

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2 sample and take it and get it analyzed for PCBs to
3 show that that's what was going on. But the people
4 working at the plant knew that's what was going to
5 the river, and they knew that the BOD and COD were
6 elevated because of those. And those were the
7 standards that environmental enforcement was based
8 on at that time. And had they complied with those
9 standards and did what they were asked to do, they
10 would've stopped dumping PCBs in the river at that
11 time.

12 Q And you've obtained this from reading the documents?

13 A I have.

14 Q Okay. When were PCBs first considered an
15 environmental concern?

16 A Well, there are some early citations. But really it
17 came to a head in the late '60s.

18 Q When in the late '60s?

19 A '68, if I recall.

20 Q Okay. I'd like to point you to the end of page 14
21 and the beginning of page 15 of your report, which
22 says, "In my opinion the ten-year period from when
23 PCBs were first identified as an environmental
24 hazard until the elimination of PCB discharge by GE
25 in 1977 demonstrates a lack of regard by GE for the

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2 Hudson River and the residents that utilize the
3 river as a source of drinking water." And is the
4 basis for that opinion the narrative you told me
5 about earlier?

6 A It is.

7 Q Okay. Are you offering here an opinion on the
8 motivations of GE in using PCBs until 1977?

9 A No.

10 Q Do you know what steps GE took to address its PCB
11 discharges between 1967 and 1977?

12 A Yes. As I said, there's a list of those. They --
13 you know, for instance sealing the sewer drains they
14 said that was, if I have the dates right, ongoing
15 from '72 to '75. It doesn't take three years to
16 seal the floor drains. That can be done in one day
17 if you wish to do it.

18 Q And do you know how many floor drains needed to be
19 sealed?

20 A It doesn't make any difference.

21 Q And what's your basis for saying that?

22 A If you want to do it, you can get in there get a
23 crew of people and seal those floor drains very
24 quickly.

25 Q And don't you have to come up with some way to deal

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2 with water that's now pooling on the floor?

3 A True enough. You've got to then put sumps in them
4 and begin pumping that to some kind of facility
5 where it's recovered.

6 Q And does that take a day to put sumps in?

7 A Well, you got to get the sumps, but it's not going
8 to take five years or three years.

9 Q But it'll take more than a day; correct?

10 A I'll grant you that. Give you two.

11 Q Okay. Ordering the sumps, sizing the sumps, getting
12 the sumps, installing the sumps, all these things
13 take some time; correct?

14 A This is not rocket science though.

15 Q All of these things take some time; correct?

16 A It takes some time. But they are locally available
17 from supply houses.

18 Q Do you know it was locally available from supply
19 houses back in the early '70s near Fort Edward and
20 Hudson Falls, New York?

21 A These were commonly used equipment.

22 Q Do you know what was locally available in the late
23 '60s and early '70s near Hudson Falls and Ford
24 Edward, New York?

25 MR. BOYAJIAN: Objection to the form.

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2 A I have not made a survey there during that time
3 period, but I can assure you that they were
4 available.

5 Q Okay. I'd like you to stay on page 15 please and
6 I'm looking here at the first full paragraph that
7 starts "Monsanto the manufacturer of PCBs." I'm
8 going to focus your attention on the last sentence
9 there which says, "In my opinion the time required
10 to complete the control and containment measures in
11 the storage and transfer locations of Pyranol show
12 the lack of commitment on the part of GE to
13 environmental protection." Why in your opinion does
14 the time it took GE to complete control and
15 containment measures in a storage and transfer
16 location show a lack of commitment by GE to
17 environmental protection?

18 A Well, again it just simply took far too long.

19 Q But how does that demonstrate a lack of commitment
20 to environmental protection?

21 A Well, if they were committed to protecting the
22 environment, they would've moved much more quickly
23 to detect and repair pipe leakage and to provide an
24 impermeable surface where the unloading was taking
25 place and where the transfers were taking place, so

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2 that PCBs that spilled would not drain directly into
3 the soil.

4 Q And in your opinion how long should those control
5 and containment measures in the storage and transfer
6 locations have taken?

7 A A month. Two at the outside.

8 Q What's the basis for that opinion?

9 A I've done such things myself in those timeframes.

10 Q Okay. Any other basis?

11 A No. That will do it.

12 Q Okay. Please turn to page 16, paragraph two which
13 is the one that starts following the Monsanto
14 announcement in 1970. Do you see that?

15 A Yes.

16 Q You refer to control measures undertaken by GE to
17 reduce PCB waste water discharges and state that in
18 your opinion, "five years to implement these control
19 measures was excessive, indicating a lack of
20 responsiveness on behalf of GE to fix the problems
21 that they had allowed to continue for decades."

22 What is the basis for your opinion that GE's
23 implementation of control measures to reduce waste
24 water PCB discharges took "excessive amount of
25 time"?

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2 A Well, as we discussed some of these things could be
3 done rather quickly. Even if you, okay, got to get
4 a design engineer in there and get replumbing and
5 repiping. This shouldn't take five years. They
6 built the Pentagon in nine months.

7 Q Do you know what drainage improvements were made?

8 A Yes. Eventually they developed drainage system that
9 they could collect the drainage. They eventually
10 put a impermeable cover under the off-loading site
11 at the railroad and where the tanks were that
12 leaked, and provided pumpage so they could recover
13 that water. And not only the rainwater, but the
14 PCBs that leaked there.

15 Q And why do you think that the time it took GE to
16 reduce its PCB waste water discharges indicates a
17 lack of responsiveness on GE's behalf?

18 MR. BOYAJIAN: Objection. Asked and
19 answered. You can answer again.

20 A Just because it was quite possible to do it much
21 more quickly had they bothered to try.

22 Q Okay. On the bottom of pages 16 and the top of page
23 17 you're talking about here the disposition of the
24 notices of violation by the state. And what is the
25 opinion you're offering here?

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2 A That it was ignored.

3 Q How do you know that?

4 A Well, the record clearly shows that they first asked
5 for, as I said before, a six-month extension. And
6 then they drug their feet and finally got around to
7 take some samples and then they hid the data from
8 the state. And it took them a decade to get around
9 to doing what the state asked in '66.

10 Q So from your reading of the documents you've
11 concluded that GE just ignored the things it was
12 asked to do for a period of time that it shouldn't
13 have?

14 A Right. They waited until they were forced to do it.

15 Q Moving now to Section 4.2, General Electric use and
16 handling of PCBs. I'd like you to turn to page 18
17 on the top paragraph on page 18 which says, "The
18 loss rate of PCBs by the GE facilities was excessive
19 even when compared to relatively lack standards
20 cited by Dr. Shifrin." On what do you base your
21 opinion that GE's loss rate of PCB at Fort Edward
22 and Hudson Falls was excessive?

23 A Well, when you're looking at the numbers that were
24 developed, you know, 10,000-pounds a year or a
25 thousand pound a year or even smaller numbers that

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2 they proposed later, those are massive amounts of
3 PCBs. Because we're talking about, even the lack
4 drinking water standard we're dealing with, we're
5 talking about contaminating billions of gallons of
6 water with a very small amount of PCBs, and here
7 they're discharging tons of it.

8 Q Okay. And did you compare GE's loss rate of PCBs
9 with that of other transformer and capacitor
10 manufacturers at the time?

11 A They were the major manufacturer.

12 Q My question was, did you compare GE's loss rate of
13 PCBs with that of other transformer and capacitor
14 manufacturers at the time?

15 A I have not.

16 Q Did you compare GE's loss rate with that of other
17 industry users of PCBs at the time?

18 A I have not, but that's no excuse.

19 Q Did you compare GE's loss rate with regulations and
20 scientific knowledge concerning PCBs at the time?

21 A Well, if we look at the regulations, certainly by
22 1963 they were warned not to dump oil into the river
23 by the Army Corps of Engineers. They said if we
24 come back and find you doing it again, we'll turn
25 you over to court, federal court. I can't see where

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2 they ever -- a record of what happened next. But at
3 that time they were warned, don't dump it in the
4 river. And they continued to do that in massive
5 amounts.

6 Q Okay. So that is your comparison of GE's loss rate
7 with the regulations and scientific knowledge
8 concerning PCBs at the time?

9 A They knew it was an oil, they knew it wasn't to go
10 in the river. That's scientific. It's not a cow
11 that's not going in the river. It's oil. They knew
12 what oil was and they knew that because of the
13 navigation law Corps of Engineering was saying you
14 can't dump that in the river. So they were warned
15 before people came out with the toxicity data. And
16 my point is had they taken action at that time to
17 prevent it from going in the river, they would've
18 prevented such a large contamination that
19 resulted -- by going forward without stopping that
20 practice.

21 Q Okay. You refer here on page 18 to estimates of PCB
22 loss by J.S. Nelson and Kenneth R. Murphy, referred
23 to as K.R. Murphy. And based on those you estimate
24 that over a million pounds of PCBs were lost to the
25 environment each year by GE; correct?

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A Yes.

Q And is your opinion concerning the one million pounds based on the Nelson and Murphy documents you cite here?

A That, among other things.

Q What other things?

A I'm looking for it. Let me see if I can't it. One piece of evidence is a declaration of John A. Harrington.

Q And I believe you told me earlier, Dr. Brown, that you had not looked at the Harrington declaration until after you had written your rebuttal report. Correct?

A That's true. But it's not --

Q And so you did not rely on that --

MR. BOYAJIAN: Would you let him finish his answer?

A That's true, but certainly supports it.

Q But you did not rely on that for purposes of drafting your opinions here; correct?

A That's correct.

Q And so what I'm asking is for your opinions here do you base the opinion that over one million pounds of PCBS were lost to the environment each year by GE on

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2 anything in addition to the Nelson and Murphy
3 documents that you cite here?

4 MR. BOYAJIAN: Note my objection for the
5 record. When you say here, are you referring
6 to the four corners of his written report which
7 contains a statement that he can supplement it
8 with new information, or just the report
9 itself?

10 Q I'm referring to the report which you presented
11 contain your opinions at the time that you submitted
12 the report; correct?

13 A Yes. And I relied on the documents -- at that time
14 on the documents that are cited here. Since then
15 I've come upon additional information.

16 Q Okay.

17 A That I wanted to share with you so it wouldn't be a
18 surprise.

19 MS. WADHWANI: I'm going to go ahead and
20 mark both of these for housekeeping and then we
21 can deal with them one by one. So we are going
22 to mark as Exhibit 13 a memo by J. S. Nelson
23 dated October 30th 1969. I think that's 13
24 correct?

25 (An off-the-record discussion.)

1 KIRK WYE BROWN, Ph.D.

2 MS. WADHWANI: And I'm going to mark as
3 Exhibit 14 a letter and attachments from
4 Kenneth R. Murphy dated June 5th, 1970 to
5 Pyranol task force.

6 (Brown Exhibits 13 and 14 was marked for
7 identification.)

8 VIDEOGRAPHER: One moment, please. At
9 4:34 p.m. this is the end of disk three. Disc
10 four will follow.

11 (There was a short recess in the proceedings.)

12 VIDEOGRAPHER: At 4:38 p.m. on April 16th,
13 2014 this is disk four of the testimony of
14 Dr. Brown. Please proceed.

15 BY MS. WADHWANI:

16 Q Dr. Brown, I'd like to first direct your attention
17 to what we marked just a moment ago as Exhibit 13,
18 and ask you if this is the Nelson report to which
19 you refer in your expert report and rebuttal in this
20 case?

21 A Yes, I believe it is.

22 Q Can you please point me to where you obtained the
23 figure that you state in your rebuttal report that
24 makes it "very clear that GE released large
25 quantities of PCBs into the environmental each

KIRK WYE BROWN, Ph.D.

year"?

A Well, we do have on page four where materials were town dump or daily buried practices, 6,000 pounds.

Q You referring to section four here?

A Yes.

Q Does it state anywhere here in section four that over a million pounds of PCBs were released to the Hudson River?

A I don't see it in this one.

MR. BOYAJIAN: A million pounds total or per year?

Q Does it say anywhere here that over a million pounds PCBs per year were released to the Hudson River?

A Yeah. We may have the wrong reference. I'm not clear on this. Something doesn't seem copesetic here.

Q Okay. You're not sure if this is the Nelson report to which you referred?

A Right.

Q You think it could be a different one?

A Yes.

Q Can you describe that report to me that you think you might be referring to?

A I'd have to look it up, see where I can find it.

1 KIRK WYE BROWN, Ph.D.

2 Q Is it listed in the documents you considered in your
3 expert report?

4 A I believe it is. Yes.

5 Q So let's move on then to Exhibit 14. Is this the
6 K.R. Murphy document you referred to in your report?

7 A Yes.

8 Q Does it state anywhere here that over a million
9 pounds of PCBs were released into the Hudson River
10 each year?

11 A Well, it gives a range, 500,000 pounds to 1,400 --
12 1,400,000 pounds of liquid PCB were discharged
13 directly to bodies of water. And the Hudson River
14 was the major receiving stream.

15 Q Does it say 500,000 pounds to 1,400,000 pounds or
16 500,000 thousand pounds a year of the 1.4 million
17 pounds a per year of liquid PCBs?

18 A Okay. Yes, it says 500,000 pounds per year of the
19 1.4 million pounds per year.

20 Q Do you know what Dr. Murphy did to arrive at the
21 estimates he presented here?

22 A It's my understanding that he interviewed people.

23 Q What's the basis of that understanding?

24 A That's just a vague memory.

25 Q Do you know -- do you know who Dr. Murphy

1 KIRK WYE BROWN, Ph.D.

2 interviewed?

3 A No. I haven't been able to track that.

4 Q Do you know what analyses Dr. Murphy performed?

5 A No.

6 Q Do you know if Dr. Murphy looked at any data?

7 A I don't know whether he did or not. He was sent
8 there to figure out how much was lost, but I don't
9 know what his procedure was.

10 Q Do you know how long Dr. Murphy spent working on
11 this issue?

12 A No.

13 Q Do you know if others at the General Electric
14 Company disagreed with Dr. Murphy's estimates here?

15 A Apparently there's some disagreement, because if you
16 look at the table on -- it has a couple of Bates
17 stamps.

18 Q Sure. If you can just tell me what the table title
19 is that might help us?

20 A Okay. Specific pyrrol losses pounds per year.

21 Q So that's the second to last page of this document?

22 A Yes. And there's a number which I think was
23 2,500 pounds from Hudson Falls. Someone crossed it
24 out and said 15,000. And they did the same thing on
25 the next diagram. I have a vague memory that that

1 KIRK WYE BROWN, Ph.D.

2 was because they were trying to reflect what they
3 were doing later on, that they were decreasing this
4 number.

5 Q What who was doing later on?

6 A That GE was beginning to decrease their releases and
7 that the 15,000 was a number which would have
8 applied to years after Murphy did his original
9 study. But that's just a vague memory. I'd have to
10 dig things out to...

11 Q Do you know if others at the GE Company disagreed
12 with Dr. Murphy's estimates contemporaneous with the
13 time at which he submitted his memo?

14 MR. BOYAJIAN: Objection to the form.

15 A Yeah. I don't know the timeframe in which those
16 agreements or disagreements took place.

17 Q Okay. So you don't know if there were disagreements
18 with Dr. Murphy in 1970 after June 5th when he
19 submitted this memo?

20 A That's correct.

21 Q Can you please turn to Section 4.3 of your rebuttal,
22 which is on pages 18 through 19. And I'm actually
23 going to direct you to page 19.

24 A I've got it.

25 Q Are you there?

1 KIRK WYE BROWN, Ph.D.

2 A Yes.

3 Q And I'm going to focus on the paragraph that is
4 arguably the second full paragraph, but it's the one
5 in the middle of the page that starts, "I strongly
6 disagree with Dr. Shifrin." Do you see that?

7 A Yes.

8 Q And you say, "I strongly disagree with Dr. Shifrin
9 in that GE did understand the potential for leaks
10 and spills to cause environmental concerns." And
11 you cite here to is it the Hanford site?

12 A Yes.

13 Q And this project at the Hanford site involved
14 radionuclides?

15 A It did.

16 Q Why in your opinion should the information gleaned
17 by GE from working with radionuclides at the Hanford
18 site have taught them something about fate and
19 transport of PCBs?

20 A That the mechanisms are the same.

21 Q What are those mechanisms?

22 A The leaking of these containments onto the surface
23 is well understood at Hanford, which was the United
24 States Atomic Energy Commission site that was
25 managed by GE at the time, so these people worked

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for GE. They well understood that contaminants released on the surface drained down and reached the water table, and that it then moved laterally down-gradient towards the river and eventually discharged into the river. And in fact they eventually traced it all the way to the Pacific Ocean. They were doing calculations of that. They had models set up and they also had computer models set up. The first models were done by hand. They then developed computer models. And they studied not only radioactive things that moved, but also in addition to just moving in the water. They looked at moving in oil. So they were looking at two-phase movement. All that information was available, was available to GE because these people were on GE's payroll. In fact you can trace that some of those reports were sent to Schenectady here to GE. So they were aware of it here in New York. It wasn't something in some foreign land somewhere else. And Shifrin says nothing was known about this. He's right, nothing was known to him about this. But GE knew it, and they could have used that information to begin investigating and finding out what happened to the leaked PCBs and could have stopped the flow

1 KIRK WYE BROWN, Ph.D.

2 to the river a whole lot quicker.

3 Q Are the fate and transport mechanisms of
4 radionuclides and PCBs the same?

5 A They differ, but the principles are known how they
6 differ.

7 Q How do they differ?

8 A Well, they both dissolve in water. They will have
9 different absorption coefficients on the particles
10 through -- pass which they move. But those are
11 parameters that were being studied and known at the
12 time.

13 Q And what are radionuclides?

14 A Radionuclides are chemicals or atoms that emit
15 radiation.

16 Q And thank you. Even though it's spelled the way it
17 is, it's radionuclides.

18 A Oops.

19 Q I'm going to follow your pronunciation because you
20 will know better than me.

21 A Yep. Radionuclides is what it should be.

22 Q Okay. Radionuclides?

23 A Yes. Spellcheck doesn't catch these things.

24 Q No worries. Do radionuclides share the same
25 chemical properties as PCBs?

1 KIRK WYE BROWN, Ph.D.

2 A They will -- as I said, there are certain
3 characteristics that are known about different
4 chemicals, their solubility in water, their
5 partition coefficients, their density, their vapor
6 pressure, their Henry's Law constant. All of those
7 parameters can be put into a model that will handle
8 radionuclides. The same model will handle organic
9 chemicals like PCB if you just change the parameters
10 in there that are specific to each chemical and that
11 you can calculate how far these move.

12 Q Do -- strike that.

13 Is a radionuclide an atomic particle?

14 A Yes.

15 Q Do radionuclides contain the same level of
16 solubility as PCBs?

17 A It's different. But what I said is if you have a
18 model that runs radionuclides and now you want to
19 run the model with PCBs, you change the parameters
20 that are specific to PCBs and then the model will
21 show you how the PCBs move in the groundwater.

22 Q Right. By my question wasn't about the model. My
23 question was just do they contain the same level of
24 solubility?

25 A No. They will differ.

1 KIRK WYE BROWN, Ph.D.

2 Q Okay. Can you please turn to page 32 of your
3 rebuttal. And I'd like to look at Section 6.2, Use
4 of Granular Activated Carbon. Can you tell me what
5 opinion you're offering here?

6 A Well, as I said before, it's a potential water
7 treatment. It's been used elsewhere for other
8 chemicals and PCBs. It's expensive. You've got to
9 discharge the water. The backflush exceeds the
10 90-nanograms per liter for the State of New York.
11 It's a -- there are -- it's not perfect. There's a
12 list they're tunneling which causes breakthrough,
13 ineffective absorption, loss of particulates from
14 the filter, additional manpower, testing, energy.
15 So it's cost -- and it's not foolproof. So that's
16 the problem with it.

17 Q And when you're talking about in the second
18 paragraph on page 32, "I was not in favor with the
19 decision to use activated carbon as a treatment
20 process for drinking water," are you referring there
21 to both granular activated carbon and powered
22 activated carbon?

23 A Yes.

24 Q Are you aware that Halfmoon designed and built its
25 water treatment plant in the early 2000s with a

1 KIRK WYE BROWN, Ph.D.

2 powder activated carbon or PAC systems?

3 A Yes.

4 Q Before Halfmoon switched over to Troy water during
5 the Phase 1 dredging season in May of 2009, what did
6 the Town of Halfmoon do with its backwash from its
7 PAC system?

8 A I'm not aware of what they did with it.

9 Q Okay. And is that also true of when Halfmoon
10 resumed using its water treatment plant after the
11 Phase 1 dredging season and before again went to
12 Troy water in March of 2010 that you don't know how
13 it disposed of its PAC backwash?

14 A No, I don't.

15 Q You refer here in this paragraph that I was just
16 talking about at the end of the paragraph in
17 parentheses to the added expense for disposal and
18 handling costs Halfmoon would have incurred had it
19 relied on a PAC system during dredging. Do you know
20 how much those added expenses would have been?

21 A No. I didn't have an opportunity to get those
22 together.

23 Q Okay. So can you say sitting here today whether
24 those expenses would have been more or less than the
25 incremental cost Halfmoon was paying for obtaining

1 KIRK WYE BROWN, Ph.D.

2 Troy water?

3 A I don't know.

4 MR. TEDESCO: Object to the form.

5 Q Please turn to page 33 at the top. So I'm still in
6 the Section 6.2 and just closing out with your
7 opinions here. What is the basis for your opinion
8 that the Troy water connection was the least
9 additional cost for the Town of Halfmoon?

10 A Well, most reliable I believe -- I have to go back
11 and check what I looked at on the costs. I don't
12 recall.

13 Q Do you know what the cost differential between the
14 incremental water used through the connection with
15 Troy versus Halfmoon using a PAC system
16 during dredging would have been?

17 A No, I'd have to look at the information on that.

18 Q So are you able to say that the City of Troy
19 connection was the least add-on cost option?

20 MR. TEDESCO: Objection to the form.

21 A At the time I wrote the report that opinion was
22 based on what I had available to me. But I haven't
23 looked at that since.

24 Q And what was available to you?

25 A There were some documents, but it's vague to me.

1 KIRK WYE BROWN, Ph.D.

2 I'd have to go back and look.

3 Q All right. But you didn't include in your report
4 here any assessment on the cost?

5 A I did not.

6 Q If you could please turn to page 35 of your
7 rebuttal. Now, it's your opinion, correct, that
8 Halfmoon's use of Troy water full-time during the
9 Phase 1 on-season dredging period and since March
10 2010 is consistent with the NCP; correct?

11 A Yes.

12 Q What is the basis for that opinion?

13 A Well, the EPA and the state approved that. And if
14 they're the regulatory agency, so my understanding
15 is their approval of such a switch means that it's
16 substantially in compliance with the NCP.

17 Q Did you review any provisions of the NCP prior to
18 arriving at your opinions in these reports?

19 A I don't remember specific provisions, but I've
20 looked at that many times in the past. And so I was
21 relying on my memory and understanding of it.

22 Q And when you say in the past, do you mean for
23 projects other than the project that you engaged for
24 in this case, meaning these rebuttal reports?

25 A Yes.

1 KIRK WYE BROWN, Ph.D.

2 Q When is the last time that you looked at the NCP?

3 A Oh, it's been three or four years.

4 Q Now, you don't cite any NCP provisions in your
5 rebuttal report. So my question is what provisions
6 did you rely upon in coming to your conclusion here
7 that Halfmoon's decision to go on Troy water
8 full-time was consist with the NCP?

9 A I didn't cite anything. And the other thing I would
10 say it's more really a legal question than a
11 scientific technical question.

12 Q Okay. But you've offered an opinion --

13 A I did, yes, I admit that.

14 Q Dr. Brown, and I'm just trying to understand the
15 basis for that opinion.

16 A It was my understanding of what was consistent with
17 the NCP.

18 Q And I'm saying what provisions of the NCP did you
19 rely upon in coming to your conclusion that
20 Halfmoon's use of Troy water was consistent with the
21 NCP?

22 A I'd have to go back and review it to tell you which
23 ones.

24 Q Is it your opinion that Halfmoon's actions
25 constitute a response action or a remedial action

1 KIRK WYE BROWN, Ph.D.

2 under CERCLA and the NCP?

3 A Well, that's a legal question.

4 Q So you're not able to say either way?

5 A I wouldn't say either way.

6 Q Does the NCP include the steps that a party has to
7 take in order to make a cost recovery claim for
8 response costs under CERCLA?

9 A Yes, they do.

10 Q What steps under the NCP was Halfmoon required to
11 take?

12 A I'd have to go back and check. I haven't looked at
13 that for a long time.

14 Q Do you know if Halfmoon in fact took those steps?

15 A I do not.

16 Q And what is the basis for your disagreement with
17 Mr. Johnson that Halfmoon was not responsible for
18 performing an RI/FS under the NCP?

19 A Well, if you're the responsible party for a
20 Superfund sight and your waste leaks over onto
21 somebody else's property or runs down a stream and
22 inhibits somebody from using that, the owner of the
23 property or the person trying to draw that stream
24 are not responsible for doing an RI/FS. It's the
25 originator of the waste. The originator of the

1 KIRK WYE BROWN, Ph.D.

2 contamination in my view that has to do that RI/FS.

3 Q Do you know if under the NCP Halfmoon was required
4 to perform an RI/FS?

5 A If they were, I'm not aware of that.

6 Q I just have a few housekeeping things to discuss
7 with you, so I'm going to go back to your original
8 report, and I'd like to focus you on Section 4.9.
9 And the opinion that -- I'm sorry, that's on page
10 41, but I think you might have found that. The
11 opinion here is, "That in order to restore the well
12 field for future use, it is my opinion that the PCBs
13 and the aquifer materials of the Stillwater aquifer
14 must be removed, and the aquifer must be isolated
15 from the river so that infiltration from the river
16 cannot recontaminate the aquifer." Was this an
17 opinion that you were offering in support the
18 Village of Stillwater's claims in this case?

19 A Yes.

20 Q And now that the Village of Stillwater has settled
21 with GE, do you intend not to offer this opinion at
22 trial?

23 A It won't be pertinent.

24 Q Okay. And is that true throughout your reports that
25 insofar as you have opinions here concerning claims

KIRK WYE BROWN, Ph.D.

for alternative water by Waterford and Stillwater,
you don't intend to offer those at trial; correct?

A Some of those would also be applicable to Halfmoon
and the potential for Saratoga County Water
Authority claims and I would reserve those to be
used at trial as necessary.

Q Well, I guess my question is, you don't intend to
speak to the claims by Waterford and the Village of
Stillwater as made in this litigation that they
required alternative water and that they are owed
recovery for the costs incurred?

A No, not that. But the technical basis is the same
for all parties.

MS. WADHWANI: Okay. Just give me two
minutes. I think we're done, but I just want
to look at my notes.

VIDEOGRAPHER: Would you like to go off
the record?

MS. WADHWANI: Yes, please.

VIDEOGRAPHER: Off the record at 5:04 p.m.
(There was a short recess in the proceedings.)

VIDEOGRAPHER: On the record at 5:09 p.m.

MS. WADHWANI: Dr. Brown, I have no
further questions. Thank you very much for

1 KIRK WYE BROWN, Ph.D.

2 your time today.

3 THE WITNESS: Thank you.

4 VIDEOGRAPHER: At 5:09 p.m. this ends
5 today's deposition. Thank you.

6 (Whereupon, at 5:09 p.m., the examination of
7 KIRK WYE BROWN, Ph.D. in the above-entitled
8 matter was concluded.)

9 *****

EXHIBITS

BROWN

EXHIBIT NO.	DESCRIPTION	PAGE
Exhibit 1	Dr. Brown's expert witness report	10
Exhibit 2	Dr. Brown's expert rebuttal report	10
Exhibit 3	Dr. Brown's updated resume	11
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Exhibit 12	Annual Drinking Water Quality Report for 2008 for Town of Halfmoon Consolidated Water District	194
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STATE OF NEW YORK)
)
 SS.
)
 COUNTY OF)

I, Kirk Wye Brown, Ph.D., have read the
 foregoing record of my testimony taken at the
 time and place as noted in the heading hereof
 and I do hereby acknowledge it to be a true and
 correct transcript of the same.

 KIRK WYE BROWN, Ph.D.

Sworn to before me this _____
 day of _____, 201____

 Notary Public
 Commission Expires:

C E R T I F I C A T I O N

I, Diane Daly-Gage, Shorthand Reporter and
Notary Public in and for the State of New York,
do hereby certify that the foregoing record
taken by me at the place and date noted in the
heading hereof is a true and accurate
transcript of same to the best of my ability
and belief.

Diane Daly-Gage

Dated: April 28, 2014

1 NAME OF CASE:

2 DATE OF DEPOSITION:

3 NAME OF WITNESS:

4 Reason Codes:

5 1. To clarify the record.

6 2. To conform to the facts.

7 3. To correct transcription errors.

8 Page _____ Line _____ Reason _____

9 From _____ to _____

10 Page _____ Line _____ Reason _____

11 From _____ to _____

12 Page _____ Line _____ Reason _____

13 From _____ to _____

14 Page _____ Line _____ Reason _____

15 From _____ to _____

16 Page _____ Line _____ Reason _____

17 From _____ to _____

18 Page _____ Line _____ Reason _____

19 From _____ to _____

20 Page _____ Line _____ Reason _____

21 From _____ to _____

22 _____

23 _____

24 _____

25 _____

1
2 STATE OF ~~NEW YORK~~)
3 ~~TEXAS~~)
4 COUNTY OF Brazos)
5

6 I, Kirk Wye Brown, Ph.D., have read the
7 foregoing record of my testimony taken at the
8 time and place as noted in the heading hereof
9 and I do hereby acknowledge it to be a true and
10 correct transcript of the same. SEE ATTACHED
11 ERRATA SHEETS.
12

13 Kirk Wye Brown

14 KIRK WYE BROWN, Ph.D.

15 Sworn to before me this 12

16 day of June, 2014

17
18 [Signature]

19 Notary Public
20 Commission Expires:
21
22
23
24
25



CASE: Town of Halfmoon v. General Electric Company, 1:109-cv-00227;
SCWA v. General Electric Company, 1:11-cv-0006
DATE: April 16, 2014
WITNESS: Kirk W. Brown

Reason Codes:


1. To clarify the record.
2. To conform to the facts.
3. To correct transcription errors.

ERRATA SHEET

Page/Line	Description	Reason
P7 L11	Replace "report" with "reports"	3
P8 L24	Insert "for my original report" after the word "not"	1
P11 L11	Replace "Goladay" with "Golladay"	1
P12 L8	Insert the word "rebuttal" before the word "report"	1
P12 L11	Replace the word "databank" with "database"	3
P14 L6	Replace "15" with "17"	1
P16 L17	Replace "altered" with "were altered,"	3
P39 L20	Replace "loaded" with "load"	3
P40 L12	Replace "drape" with "rate"	3
P51 L3	Replace "excreted" with "transferred"	1
P58 L13	Replace "own" with "only"	3
P58 L23	Replace "around" with "and"	3
P65 L21	Replace "micrograms" with "nanograms"	1
P72 L7	Insert comma after "dredging"	3
P72 L8	Delete comma after "it"	3
P73 L24	Replace "--" with "suspended"	3
P76 L13	Replace "cell" with "soil"	3
P76 L16	Replace "sole" with "soil"	3
P78 L6	Delete "them" after the word "move"	3

Page/Line	Description	Reason
P98 L15	Replace “re-dredging” with “during dredging”	3
P98 L25	Replace “isn’t” with “is”	1
P99 L19	Replace “protectant” with “protective”	3
P115 L7	Replace “press” with “pretty”	3
P129 L5	Replace “significant” with “significantly”	3
P134 L19	Replace “off out” with “out of”	3
P165 L22	Insert the word “clear” after the word “particularly”	3
P165 L24	Replace the word “the” with “they”	3
P167 L11	Replace “pyrrols” with “pyranols”	3
P168 L1	Replace “pyrroles” with “pyranols”	3
P169 L21	Replace “pyrrols” with “pyranols”	3
P175 L21	Replace “pyrrols” with “pyranols”	3
P175 L22	Replace “deluded” with “diluted”	3
P176 L1	Replace “pyrrol” with “pyranol”	3
P184 L19	Replace “will” with “well”	3
P199 L13	Replace “pyrrols” with “pyranol”	3
P199 L15	Replace “pyrrol” with “pyranol”	3
P199 L17	Replace “pyrrol” with “pyranol”	3
P211 L11	Delete the word “not” after the word “that’s”	3
P211 L13	Insert a comma after the word “law”	3
P212 L8	Replace “can’t it” with “can get it”	3
P215 L5	Insert the words “disposed in the”	1
P215 L5	Replace “6,000” with “60,000”	1
P215 L15	Replace “yeah” with “no”. On page 18 of my rebuttal report, my report stated, “Based on the estimates of Nelson and Murphy, it is very clear that GE released large quantities of PCBs, in excess of 1,000,000 lbs, to the environment each year, which contributed to the contaminated sediments and water column concentrations in the Hudson River.”	1,2
P217 L20	Replace “pyrrol” with “pyranol”	3

Page/Line	Description	Reason
P217 L23	Replace "2,500" with "250,000"	1
P223 L9	Insert the word "wash" before the word "water"	1
P223 L12	Replace "list they're" with "list, there is"	3
P228 L20	Replace "sight" with "site"	3
P228 L23	Insert the word "from" after the word "draw"	1


 Kirk W. Brown